

Cape Ann Transportation Authority Regional Transit Plan

Final Plan - June 2015

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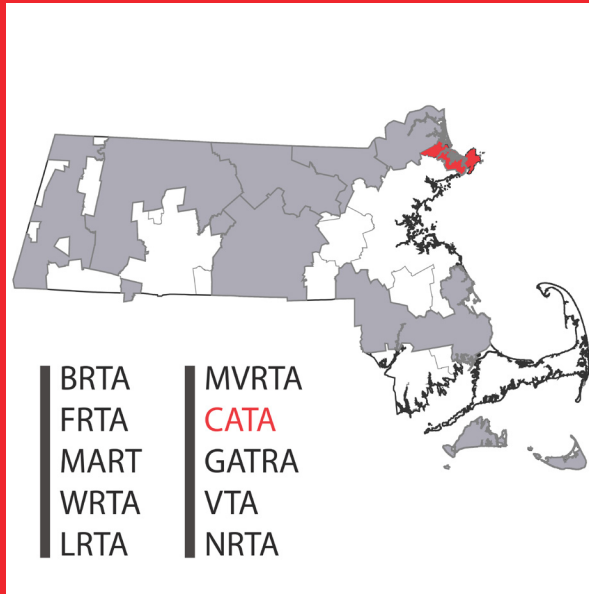
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Executive Summary

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EXECUTIVE SUMMARY

Overview:

Cape Ann Transit Authority (CATA) provides fixed route bus service to the communities of Gloucester, Rockport, Ipswich, and Essex. Figure 1 depicts CATA's service area.

Figure 1. CATA Service Area



With a fleet of 17 vehicles, CATA operates fixed-route service, seasonal service, school tripper service, ADA paratransit service, and Dial-a-Ride service. There are fifteen (15) fixed bus routes and 4 seasonal shuttles which provide weekday service between 6:15 AM to 6:45 PM and limited weekend service. CATA provided over 178,162 passenger trips in FY 2014.

The State Legislature, in response to requirements of the Transportation Finance Bill passed in 2013, tasked each Regional Transit Authority (RTA) in the Commonwealth of Massachusetts to prepare a Regional Transit Plan. The purpose of this plan is to:

- examine CATA's existing service

- identify local markets with potential ridership
- provide recommendations on ways to improve service operations.

The consultant firm of AECOM (formerly URS) was selected to prepare this plan with assistance provided by CATA, MassDOT, and local stakeholders.

Recommended Phase Approach

To meet the goals of the plan, recommendations are made to improve CATA service over 3 phases, as follows:

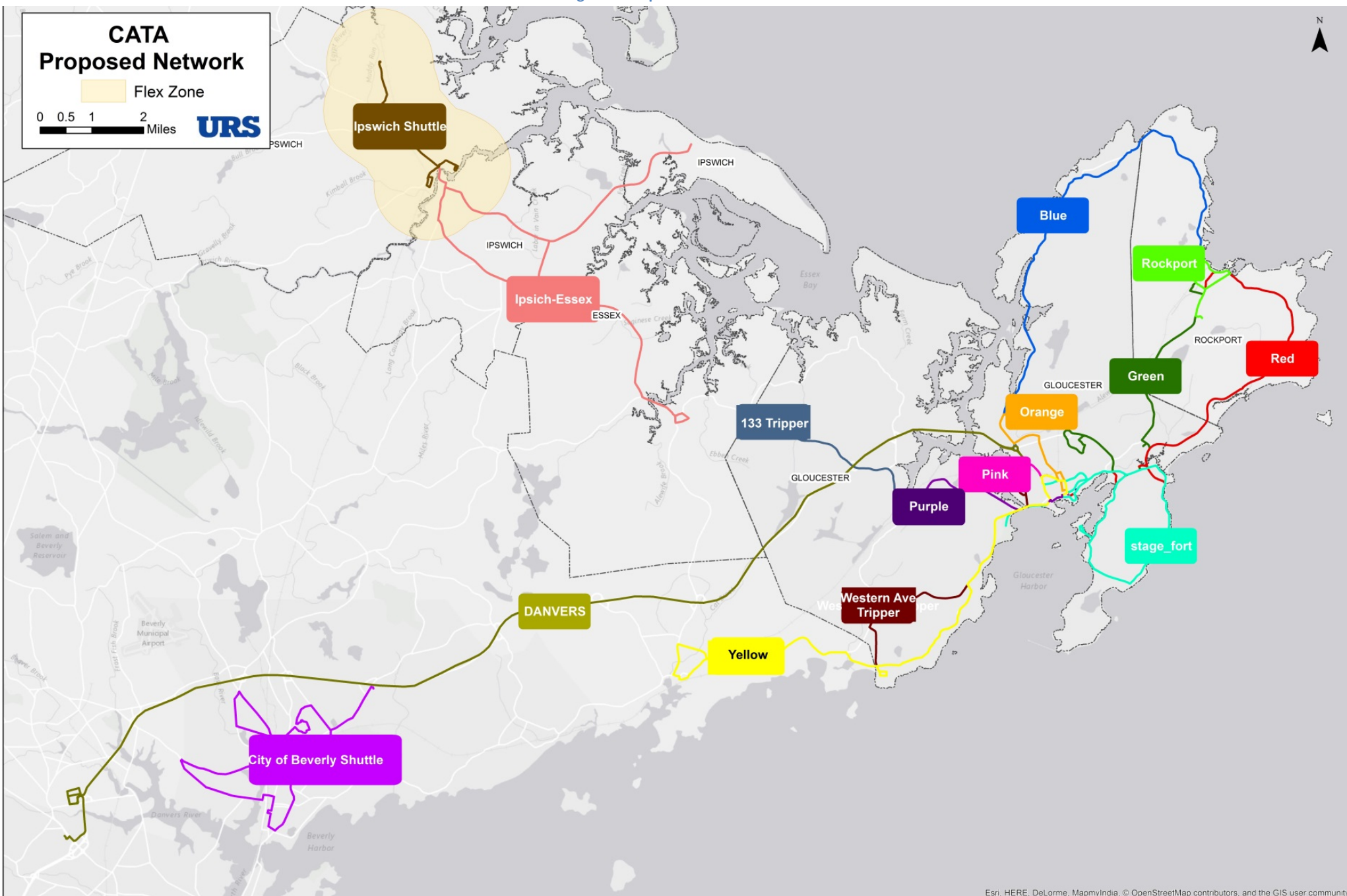
In Phase 1, alignments have been made so routes can provide direct, bidirectional service to high demand areas. Route frequencies have been standardized and service hours have been extended to provide service later into the evening.

During Phase 2, route frequencies have been further improved from the previous phase in order to streamline CATA's routes.

Lastly in Phase 3, Sunday service has been implemented on select routes. CATA should also explore providing service to potential passengers in Manchester by the Sea.

Figure 2 depicts the CATA service area with the proposed route network based on the recommendations in all three phases.

CATA Proposed Network



Benefits

Implementing the phased recommendations would provide benefits to CATA and aid them in meeting their goals and objectives to provide a cost-efficient system while maintaining a high level of service to its riders. The phased service improvements would result in the following benefits:

1. Standardizing frequencies would create a simpler, user-friendly system for CATA riders.
2. Improving route frequencies would provide a higher and more convenient level of service to CATA riders.
3. Adjusting route alignments, extending hours of operation during the week, and implementing service on Sunday would expand mobility in the region.

The following are CATA objectives that have been met through the development and selection of the phased recommendations:

Goal #1: Increase Frequency of Service to Better Serve Senior Citizen Population

Objective 1.b: Adjust service options and frequencies to match with the identified needs.

Objective 1.c: Increase transit frequency and service options to make bus use an attractive transportation alternative.

Goal #5: Improve the Current Transit Services

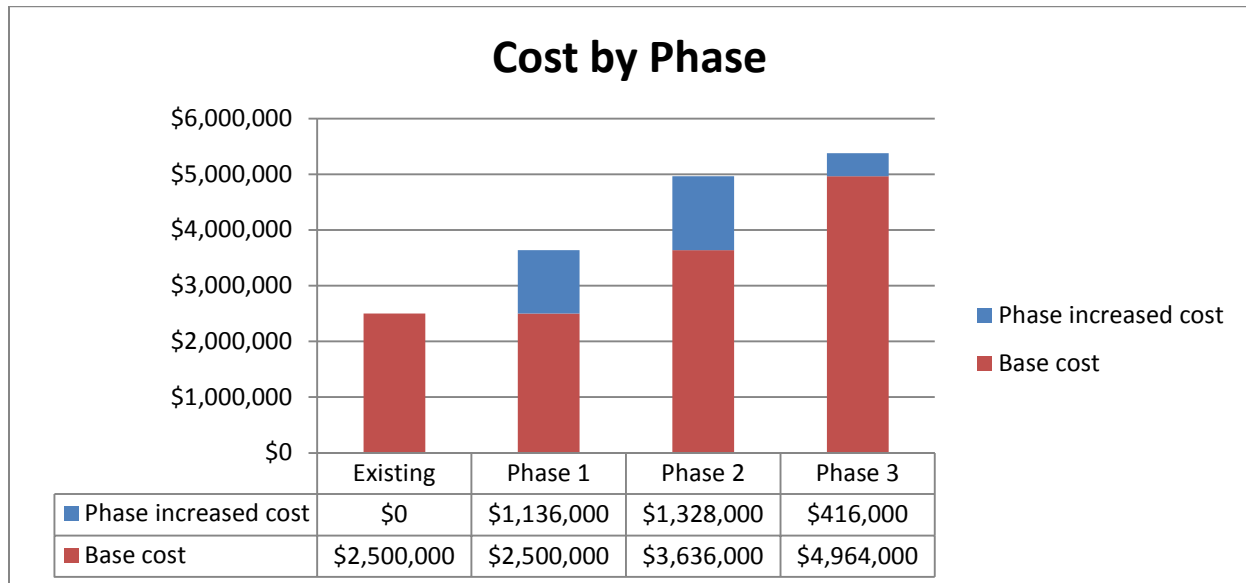
Objective 5.a: Improve frequency of service on high performing routes from current frequencies to 60 minutes during the weekday and Saturday.

Cost Estimation

With the implementation of each phased recommendation, additional operational and capital improvements would increase CATA's annual cost. Figure 3 depicts the base operating costs for the existing system along with the additional costs associated with the service improvements in each phase.

CATA's existing annual revenue operating hours are 15,500; these hours are expected to increase throughout each phase. During Phase 1 annual revenue hours would increase by 7,100; annual revenue hours would increase by 8,300 in Phase 2 and finally by 2,600 to an estimated 33,400 hours in Phase 3.

Figure 3. Cost by Phase



Capital Costs

Phase 1 service improvements have been designed using the constraint of CATA's existing fleet of 17 buses, 8 of which are used during peak service. Additional vehicles will be required for the recommendations presented in Phases 2 and 3. To implement these phases in a timely manner, CATA must begin the planning process now as vehicle procurement can take up to two years before the buses can be put into service. During peak service, Phase 2 and Phase 3 will both require 13 vehicles.

Framework

Recommendations were developed using a cumulative process that incorporated public outreach, a diverse steering committee, operational input from CATA, and analysis of existing transit service and the local/regional market. Strategies to improve the system were developed based on CATA's goals and objectives and the following guidelines:

1. **Simplify** – Routes should be designed along main corridors with minimal schedule deviations. For routes that are not linear, service should be provided in both directions.
2. **Service should match demand** – The denser (both in terms of employment and population) areas should have a higher level of service with either higher frequency routes or multiple lower frequency routes. Major corridors often warrant higher frequencies. Routes that focus on connecting the High School to the community should be separated out as trippers and operate during select times only.
3. **Standardized frequency** – Frequencies should be standardized using clock-face schedules to create 30, 60 and 120 minute headways.
4. **Priority to existing ridership** – Service should be increased in areas that warrant it over servicing new areas if limited resources are available.

5. **Connections** – No route should be designed in isolation. If possible it should connect to at least one hub. Where connections to hubs are not possible the route should connect with at least one other route to facilitate transfers.
6. **Efficiency** – Where possible routes should be designed to be the most efficient. Decisions to deviate off the main corridor and add time to the route are only warranted where key destinations like shopping centers are too far off the main road, there are a lack of pedestrian facilities or the benefit (due to demand) of servicing the deviation outweighs the additional time incurred to others on the route.
7. **Consistency** – Except where warranted by peak only routes or increased peak hour service, service should have consistent headways throughout the day using clock-face schedules.
8. **Regional network** – Regional connections should be improved to provide access outside of the CATA service area through transfers with other systems such as the MBTA or commuter rail.

Task Summaries

The Transportation Finance Bill assigned the following nine tasks to be evaluated by each RTA:

Task 1. Comprehensive Assessment of Transit Services

At the beginning of the study process CATA identified five goals to help guide service improvements. These goals, as outlined below, have been considered in the development of this Regional Transit Plan.

Goal 1: Increase Frequency of Service to Better Serve Senior Citizen Population

Goal 2: Bridge the Gap Between CATA and MBTA Service in Communities Like Beverly

Goal 3: Increase Transit Ridership From Tourism

Goal 4: Improve Communication with Department of Public Works and Other Departments to Facilitate Improved Transit Service

Goal 5: Improve the Current Transit Services

Task 2. Examination of Ridership Trends

Ridership data collected from FY 2012, 2013, and 2014 was used to analyze yearly transit ridership trends. In FY 2014, CATA reported 178,162 passenger trips. Ridership on CATA routes has decreased over the past few years; between FY 2012 and 2014 ridership decreased by 7.8%. All but three routes experienced a decrease in weekday ridership during this period; ridership increased by 13% on the Beverly Route, 12% on the Red Route, and 3% on the Orange Route. The following three routes experienced the most significant decreases in weekday ridership between FY 2012 and 2014: Green Route (12%), Yellow Route (35%), and the Purple Route (50%).

Task 3. Performance Analysis of Service

Each route in the CATA service area was evaluated based on several factors including ridership, passengers per revenue hours, and subsidy per passenger. The top three performing routes during the weekday include the Orange Route, Rockport Route, and Blue Route. These routes are top priorities for service investment and may benefit from increased service frequencies or service spans. Routes

performing below average, such as the Purple Route, may require additional analysis to determine the cause of the problem or may be considered for discontinuation of service.

Task 4. Develop and Evaluate Service Alternatives

Service alternatives for the entire CATA system were evaluated through a process that incorporated public outreach, a diverse steering committee, operational input from CATA, and analyses of the existing transit service and local market. Alternatives were guided by the five goals identified by CATA to improve service. Preliminary alternatives were presented to CATA at a workshop where they were further refined.

Task 5. Recommendations to Better Align Service

Recommendations for CATA have been presented through a three phase approach. Phases establish the immediacy and prioritization of needs and are based on an incremental approach and by the availability of resources. Recommendations in Phase 1 can be implemented immediately while recommendations in Phase 2 and 3 can only be implemented as resources become available.

Phase 1 recommendations include alignment changes, extending weekday evening service hours, and standardizing frequencies. Phase 2 seeks to improve frequencies to streamline CATA's routes. In Phase 3, service is implemented on Sundays.

Task 6. Commonwealth's Environmental Policies

GreenDOT's implementation plan, developed in 2012, identifies themes, goals and indicators to guide transportation development to a more sustainable future. An evaluation of CATA's services was conducted to determine their ongoing compliance with the policy. While there are over 300 short, medium, and long-term indicators, only 55% are applicable to CATA. Of these applicable indicators, CATA is already meeting 46% and working towards meeting additional medium-term indicators by 2015 and long-term indicators by 2020.

Task 7. Fare Rates and Collection Methods

In March 2012, CATA installed a Scheidt & Bachmann Fare Collection system on fixed route buses which offers SmartCard capabilities and is interoperable with CharlieCard. CATA fares are zone-based; a standard in-town fare is \$1.00, an out-of-town fare costs \$1.25, and the Danvers/Peabody Mall Bus charges \$3.00 one-way or \$5.00 roundtrip. Currently, the only passes available are student semester and student annual passes. Moving forward, CATA should explore new technology, such as mobile payments or Bpay/Magic Band/Uband, to replace outdated fare collection methods.

Task 8. Region's Job Creation Goals and Employment Needs

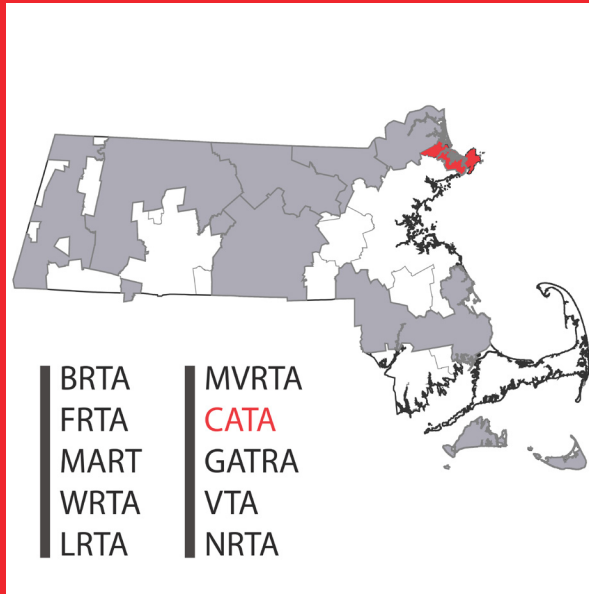
CATA's region is shifting from an economy that was once dominated by maritime-related industries to one that is now supported by education, healthcare, and professional/scientific technical services. More than half the jobs in the region are located in Gloucester. Understanding the region's employment sector will allow CATA to provide a better level of service to workers in the region.

Task 9. Determination of Effectiveness of CATA Service to Meet the Needs of the Region's Workforce

The following indicators were used to identify demand levels across the region: population density, employment density, elderly populations, zero vehicle households, median household income, disabled households, schools, colleges and universities, hospitals, priority development areas, park and ride lots, and commuter rail. The analysis revealed that overall CATA provides service to all areas with the highest transit demand. Four areas in Gloucester, Essex, and Ipswich demonstrate a potential for higher transit demand than what is currently provided by CATA.

Tourism is a major component of the economy in the CATA region; transportation in the summer months is vital for transporting tourists and reducing traffic in downtown Rockport and Gloucester. Extending service hours later in the evening will increase mobility in the region for residents and tourists.

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Chapter 1

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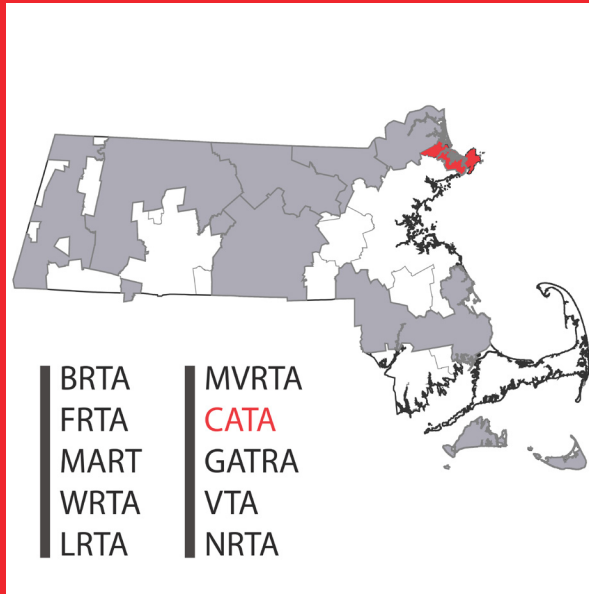
1. PROJECT OVERVIEW

The Cape Ann Transportation Authority has prepared this Draft Regional Transit Plan in accordance with the Transportation Finance Bill.

The State Legislature has instructed all Regional Transit Authorities (RTAs) in the Commonwealth of Massachusetts to undertake the preparation of a Regional Transit Plan as a requirement of the Transportation Finance Bill passed in 2013. These Regional Transit Plans present an opportunity to improve local bus service operations, identify new markets of service opportunity, and meet the identified needs for public transit services in each respective RTA service area. Section 63 of the Bill notes nine discrete tasks that each Regional Transit Plan must address. These tasks are as follows:

- (1) Comprehensive assessment of transit services
- (2) Thorough examination of the ridership trends for each line and service provided by the regional transit authority
- (3) Performance analysis of existing services
- (4) Development and evaluation of alternative service scenarios
- (5) Development of a recommendation to better align service with local and regional demand
- (6) Commonwealth's environmental policies
- (7) Fare rates and collection methods
- (8) Region's job creation goals and employment needs
- (9) Determination of whether the regional transit authority's service is deployed in the most effective way possible to accommodate the transit needs of the region's workforce.

Each RTA is also required to hold a public hearing on the draft relating to the development of its Regional Transit Plan in order to inform the public and gather their input.



Chapter 2

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2. PROJECT PURPOSE

2.1 CATA Overview

For over 40 years, Cape Ann Transportation Authority (CATA) has served citizens and tourists of Cape Ann and the North Shore, and continues to save money and protect the environment by maintaining the quality and practicality of public transportation. (CATA) operates under Massachusetts General Law Chapter 161B, a body politic and a corporate and political subdivision of the Commonwealth of Massachusetts. Its members consist of Gloucester, Ipswich, Essex, and Rockport. CATA is a non-profit transit service that offers the convenience of transportation across the Cape Ann area, including additional services to Danvers and Peabody Malls and in Ipswich, Essex and Beverly. Offering this convenience to everyone, including special accommodations to the elderly and disabled, CATA is committed to providing the absolute highest standard of public transit to its customers.

CATA has a general responsibility to develop, finance and contract for the operation of mass transportation facilities within its territory. It is authorized to improve, modify, or extend existing facilities and enter into agreements with other parties, including government agencies, municipalities, authorities, private transportation companies, railroads, corporations, and other concerns, providing for construction, operation and use by such other party of any mass transportation facility or equipment of the Authority.

The affairs of the Authority are managed by an administrator who serves as the CEO and who is appointed by and serves at the pleasure of the Advisory Board. The Advisory Board consists of the chief executive officers of each member municipality. However, they may, by writing filed with the Authority, from time to time appoint a designee to act for him or her on the Advisory Board. By law, the Advisory Board consists of the mayor of each member city, the Town Manager of each member town and the chairperson of the board of selectmen of each member town. The Advisory Board adopts an annual budget, approves changes in fares and approves substantial changes in service.

Although responsible for establishing routes and setting fares, the Cape Ann Transportation Authority is prohibited by statute from directly operating any mass transportation services. It therefore relies on contracting these services out to one or more operators.

The Authority has retained the services of Cape Ann Transportation Operating Co., Inc. to provide transit management services for the Authority's fixed route and paratransit operations.

CATA operates 15 fixed routes and 4 seasonal shuttles with weekday and limited weekend service. On weekdays, service runs from approximately 6:15 a.m. to 6:45 p.m. with frequencies varying from 20 minutes on seasonal shuttles to 2 hours on Fixed Routes. In addition to fixed routes and seasonal summer service, CATA operates school tripper routes in Gloucester. The city of Gloucester does not provide bus service for the high school service and as a result many of the students use CATA to get to

and from the high school. This service is not funded by the school. In total all routes carry almost 200,000 passengers each year.

2.2 Core Goals and Objectives

In April 2014, representatives from several Regional Transit Authorities (RTAs) were asked what they wanted their Regional Transit Plans to accomplish. Ideas were developed and ranked by these representatives to create a core list of goals and objectives for each RTA’s Regional Transit Plan. The most highly-rated concepts – and those to which each of the Regional Transit Plans will respond – are as follows:

- Better align service with needs
- Improve efficiency and cost-effectiveness of system
- Improve transit access for the public
- Increase ridership levels
- Increase transit frequency and service options
- Increase revenue
- Improve transit access for transit-dependent populations
- Support economic development

While goals outline priorities, objectives are measurable actions that are necessary to realize the goals. The above list can be broken down as follows:

Table 1. Core Goals and Objectives

Goals	Objectives
<ul style="list-style-type: none"> • Increase ridership levels • Better align service with needs • Support economic development • Increase revenue 	<ul style="list-style-type: none"> • Increase transit frequency and service options • Improve transit access for the public • Improve transit access for transit-dependent populations • Improve efficiency and cost-effectiveness of system

It should be noted that goals and objectives that were ranked favorably by individual RTAs but did not receive an overall high ranking will still be considered in the Regional Transit Plan for those authorities. Section 2.2 explains the goals and objectives that are specific to CATA.

2.3 CATA Goals and Objectives

In addition to responding to the core goals and objectives outlined in Section 2.2, the Regional Transit Plan for CATA is also based on specific concerns related to their system. This section highlights the mission, goals, and objectives of CATA.

Goal 1: Increase Frequency of Service to Better Serve Senior Citizen Population

The CATA system design should work to improve frequency of service to such areas as the Blackburn Industrial Park and Addison Gilbert Hospital and other locations to support improved mobility for senior citizens.

Objectives:

1. Work with senior citizen groups to outline service needs.
2. Adjust service options and frequencies to match with the identified needs.
3. Increase transit frequency and service options to make bus use an attractive transportation alternative.

Goal 2: Bridge the Gap Between CATA and MBTA Service in Communities Like Beverly

CATA will work to bring Manchester-by-the-Sea into its membership to allow better connectivity to Beverly.

Objectives:

1. Develop and implement a plan to demonstrate benefits of CATA membership to Manchester and coordinate with MBTA for implementation.

Goal 3: Increase Transit Ridership From Tourism

CATA would like to expand and increase services and frequencies to meet the needs of the increased and diverse summer populations in coastal communities.

Objectives:

1. Develop and implement better signage and promotion of existing park and ride facilities such as Stage Fort Park and Rockport Market park and ride.
2. Explore new locations for park and ride that are easy to access and provide quick ride to central tourist locations.
3. CATA will recalibrate its routes and park and ride facilities to provide transit service in areas that can effectively accommodate tourist parking.
4. Educate tourists about the bus system before they arrive.
5. Provide rider-friendly and accessible marketing material.

Goal 4: Improve Communication with Department of Public Works and Other Departments to Facilitate Improved Transit Service.

CATA will work closely with the DPW and other departments to mitigate any potential impacts that roadway or other construction might have on transit service.

Objectives:

1. CATA will form a working committee with DPW and other departments to meet regularly to identify construction areas and plan ways to reduce impacts on transit in the CATA service area.

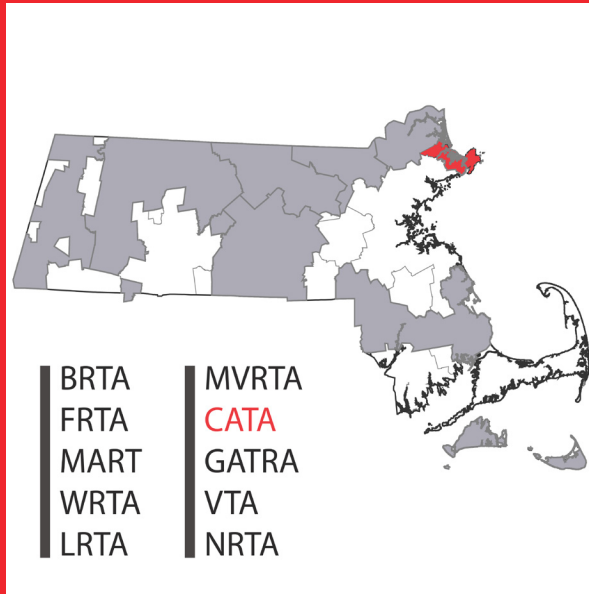
Goal 5: Improve the Current Transit Services

CATA will continually look to improve daily and Saturday service and regional connections.

Objectives:

1. Improve frequency of service on high performing routes from current frequencies to 60 minutes during the weekday and Saturday.
2. To work with other RTAs and the MBTA to further the coordination of inter-regional connections between the CATA, adjacent RTAs and the MBTA.

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Chapter 3

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3. CATA RIDERSHIP AND RIDERSHIP TRENDS

3.1 Service Overview

The Cape Ann Transportation Authority (CATA) provides transit service to the communities of Gloucester, Rockport, Ipswich, and Essex, with most service converging in Gloucester. CATA runs five types of service: fixed-route, seasonal service, school tripper service, ADA paratransit, and Dial-a-Ride senior transportation. Table 2 provides an overview of the fixed-route, seasonal, and school service operated by CATA.

CATA operates seven fixed route services that run during the weekdays and on Saturdays. Weekday services begin between 6:00 AM and 8:00 AM and end between 4:00 PM and 7:00 PM. In addition, CATA runs one commuter shuttle on Saturdays only from Gloucester to shopping malls in Danvers and Peabody.

CATA operates three seasonal services that run from June through September. These services are specifically designed to provide transportation for the many tourists who visit Cape Ann during the summer months. The Stage Fort Park Trolley and the Ipswich-Essex Explorer run only on weekends while the Rockport Loop runs on weekdays during July and August. When cruise ships are docked in Gloucester, CATA also operates a special Cruise ship Trolley that runs every 15 minutes. This service varies greatly based on the number of ships that arrive and is not included in the following analysis.

The Blue, Red, Yellow, Purple, and Orange routes operate multiple school trips to Gloucester High School each school day. The operation of these school trips is not included in the following analysis.

Table 2. CATA Route Overview

Route	Service Type	Description	Days Operated	Weekday Service Span	Weekday Frequency (min)	School Trips	Weekend Service Span	Weekend Frequency (min)
Blue	Fixed-route	Gloucester to Rockport via Lanesville	Mon-Sat	6:15 AM – 6:30 PM	120	3 AM, 4 PM	8:30 AM – 5:15 PM	120
Red	Fixed-route	Gloucester to Rockport via Thatcher Road	Mon-Sat	6:15 AM – 6:45 PM	120	2 AM, 3 PM	10:30 AM – 4:30 PM	120
Green	Fixed-route	Gloucester to Rockport via Eastern Avenue	Mon-Sat	7:30 AM – 5:45 PM	60	N/A	9:30 AM – 5:00 PM	60
Yellow	Fixed-route	Gloucester to Magnolia	Mon-Sat	7:00 AM – 3:45 PM	180-300	1 AM, 2 PM	9:00 AM – 4:15 PM	120-180
Purple	Fixed-route	Gloucester to West Gloucester	Mon-Sat	6:00 AM – 4:15 PM	300	2 AM, 3 PM	9:00 AM – 4:45 PM	120-180
Orange	Fixed-	Gloucester	Mon-Sat	8:00 AM	60	3 AM,	9:00 AM	60

Route	Service Type	Description	Days Operated	Weekday Service Span	Weekday Frequency (min)	School Trips	Weekend Service Span	Weekend Frequency (min)
	route	Crossing & Business Express Loop		– 5:00 PM		1 PM	– 3:00 PM	
City of Beverly Shuttle	Fixed-route	City of Beverly circulator	Mon-Sat	7:45 AM – 4:45 PM	60	N/A	7:00 AM – 3:15 PM	60-120
Mall Shuttle	Commuter	Gloucester to Danvers and Peabody	Saturdays Only	N/A	N/A	N/A	10:00 AM – 5:00 PM	90-120
Rockport Shuttle	Seasonal	Blue Gate Meadows Parking Lot	Varies month to month	11:00 AM – 6:45 PM	20	N/A	11:00 AM – 6:45 PM	20
Stage Fort Trolley	Seasonal	Stage Fort Park to Rocky Neck	Weekends only	N/A	N/A	N/A	10:00 AM – 5:00 PM	60
Ipswich-Essex Explorer	Seasonal	Ipswich-Essex-Crane Beach	Weekends only	N/A	N/A	N/A	10:15 AM – 5:30 PM	45

3.2 Ridership

3.21 System Ridership

CATA carries almost 200,000 passengers each year, Figure 4 shows annual ridership over the past three fiscal years¹. Results show that ridership dropped 1.4 percent between FY 2012 and FY 2013, and projections for FY 2014 suggest that ridership will decrease 6.5 percent from FY 2013. From FY 2012 to FY 2014, ridership will have decreased by 7.8 percent. Table 3 shows the percent change in ridership by day type from FY 2012 to FY 2014.

¹ FY 2014 is a projected total based on data as of March 2014

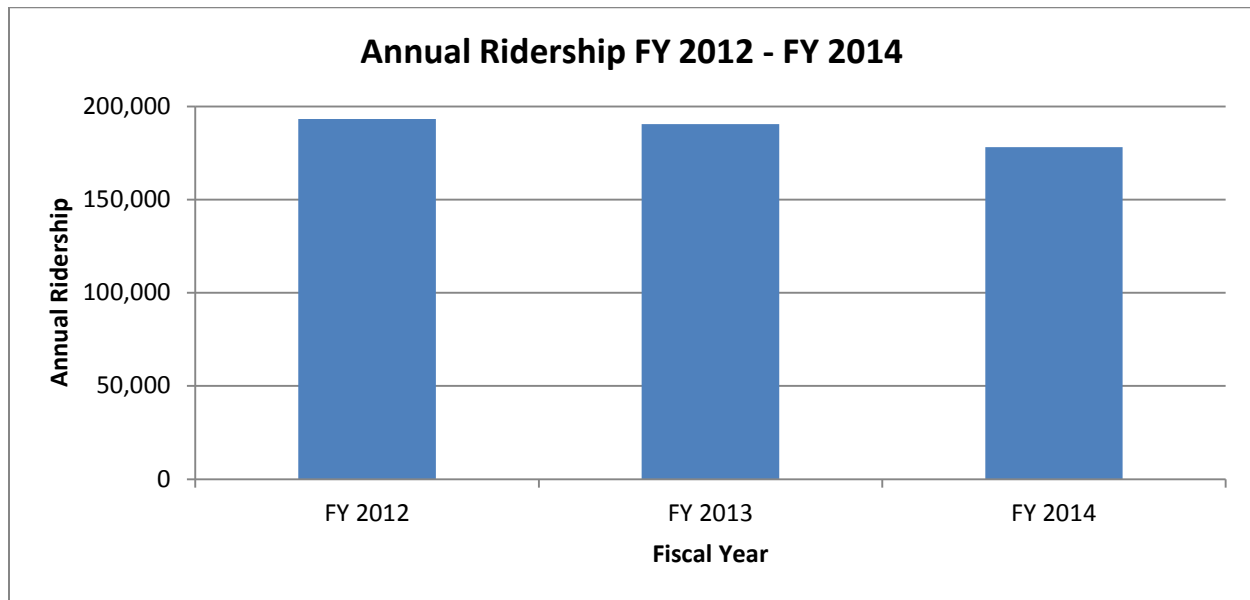


Figure 4. CATA Annual Ridership (FY 2012-FY 2014)

Table 3. Rounded Percent Change in Ridership by Day Type FY 2012 - FY 2014

Day Type	FY 2012-FY 2013	FY 2013-FY 2014	FY 2012-FY 2014
Weekday	3%	-10%	-8%
Saturday	-26%	27%	-6%
Sunday	-22%	9%	-15%
Total	-1.4%	-6.5%	-7.8%

3.22 Weekday Ridership

On average CATA carries a total of 534 passengers per weekday on the fixed routes, which operate year round. The daily average for year-round fixed-routes is 76 passengers per route. The Mall shuttle, Ipswich-Essex Explorer and Stage Fort Trolley do not operate on weekdays. The Orange route has the most weekday boardings in the system and accounts for one-third of all weekday ridership on year-round fixed-routes. When in operation, the Rockport Loop carries the second most passengers per day. The Yellow and Purple routes have the lowest weekday ridership with fewer than 25 passengers per day.

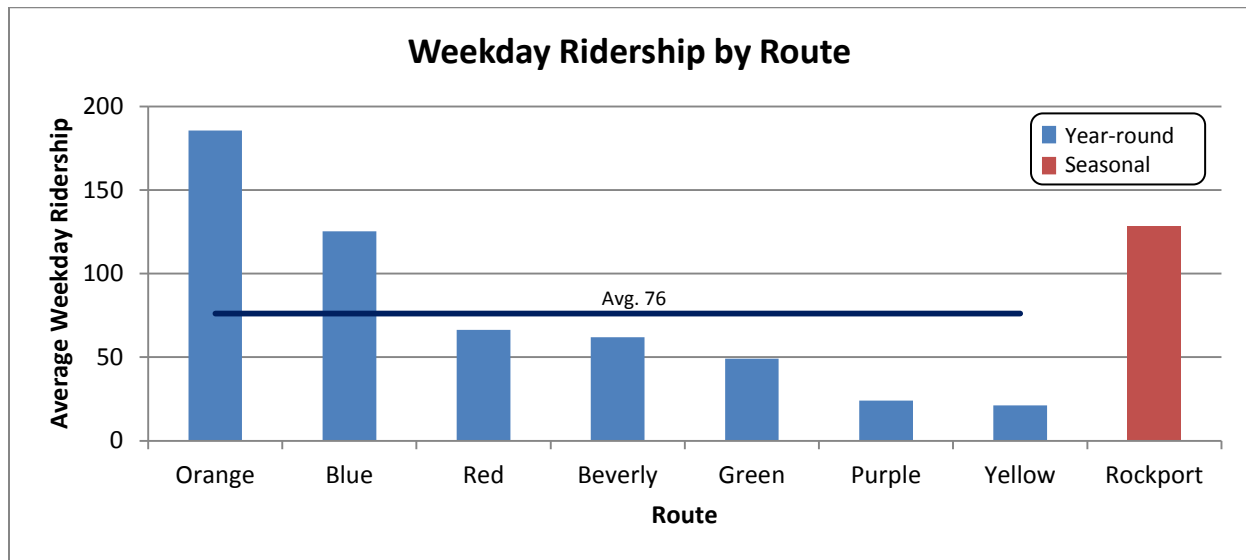


Figure 5. CATA Weekday Ridership by Route (FY 2014)

Figure 6 shows the percent change in daily average ridership from FY 2012 to FY 2014 for routes in operation during all three fiscal years. Of the eight routes, only three experienced growth in ridership. The Purple route had the largest decrease in ridership, losing one half of its riders. Overall, weekday ridership decreased by 7.5 percent. Ridership changes do not correspond to changes in service levels.

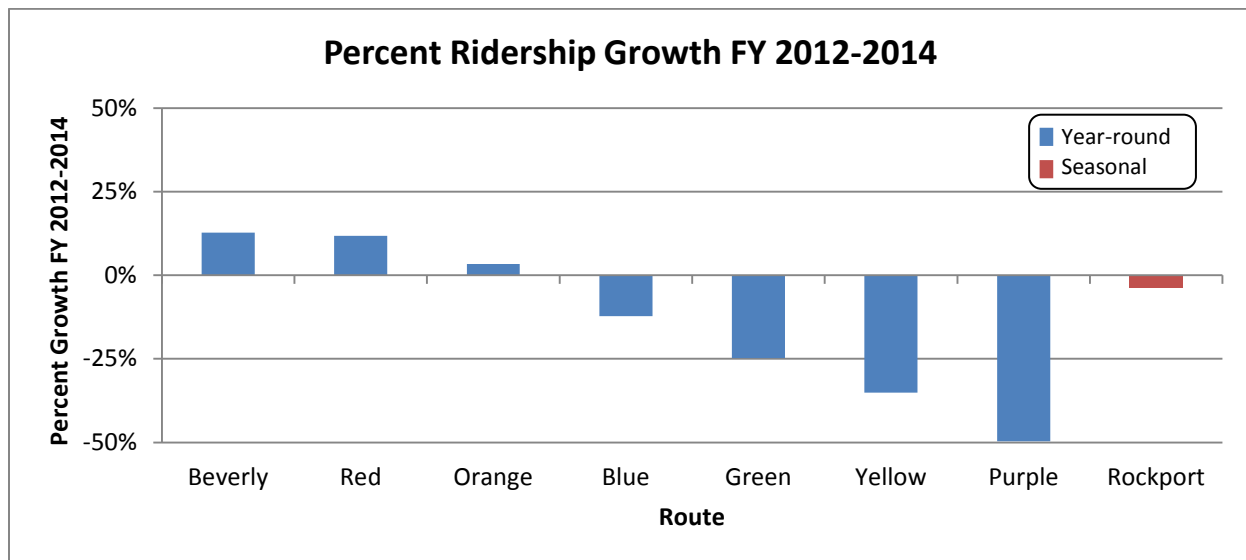


Figure 6. CATA Weekday Ridership Growth (FY 2012 to FY 2014)

3.23 Weekend Ridership

Saturday ridership per route for FY 2014 is shown in Figure 7. Saturday ridership drops significantly on weekends for year-round routes, with an average of 340 riders per day or roughly 43 passengers per route. It is important to note that CATA runs less service on Saturdays than on weekdays, contributing to lower system ridership. Saturday ridership on seasonal routes is higher than Saturday ridership on year-round routes, with an average of 643 riders per day and 214 per route. The Saturday-only route to the

Danvers and Peabody malls has the highest ridership of year-round routes on Saturdays. The Rockport Loop accounts for 45 percent of system-wide Saturday ridership. Only seasonal routes operate on Sundays. Average Sunday ridership totals 629 passengers and averages 210 passengers per route, roughly the same as Saturday ridership.

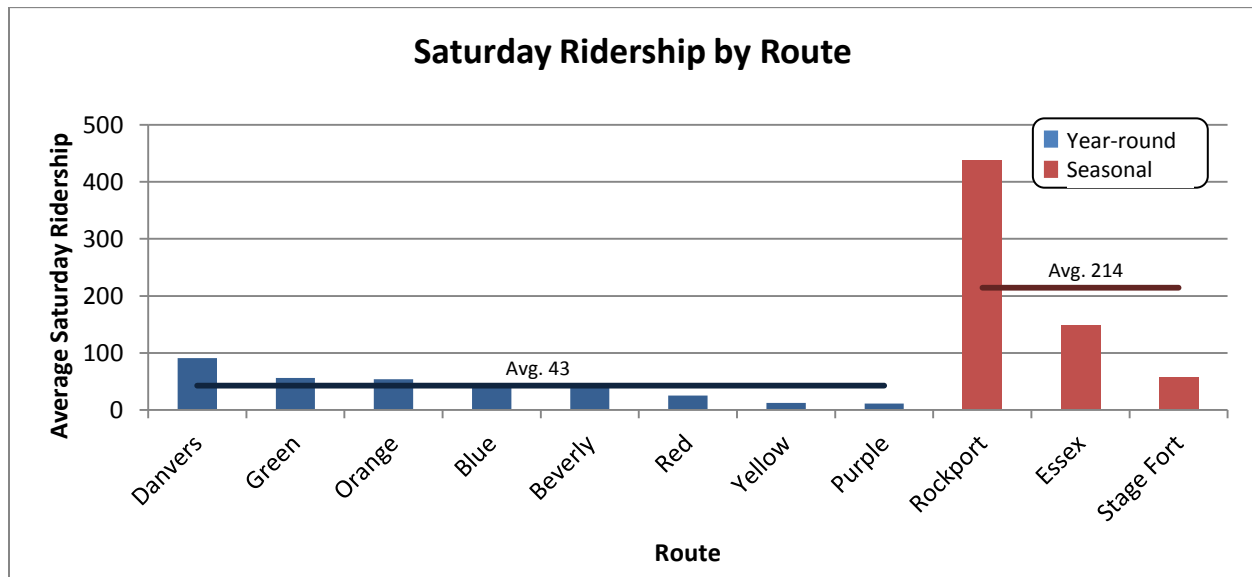


Figure 7. CATA Saturday Ridership by Route (FY 2014)

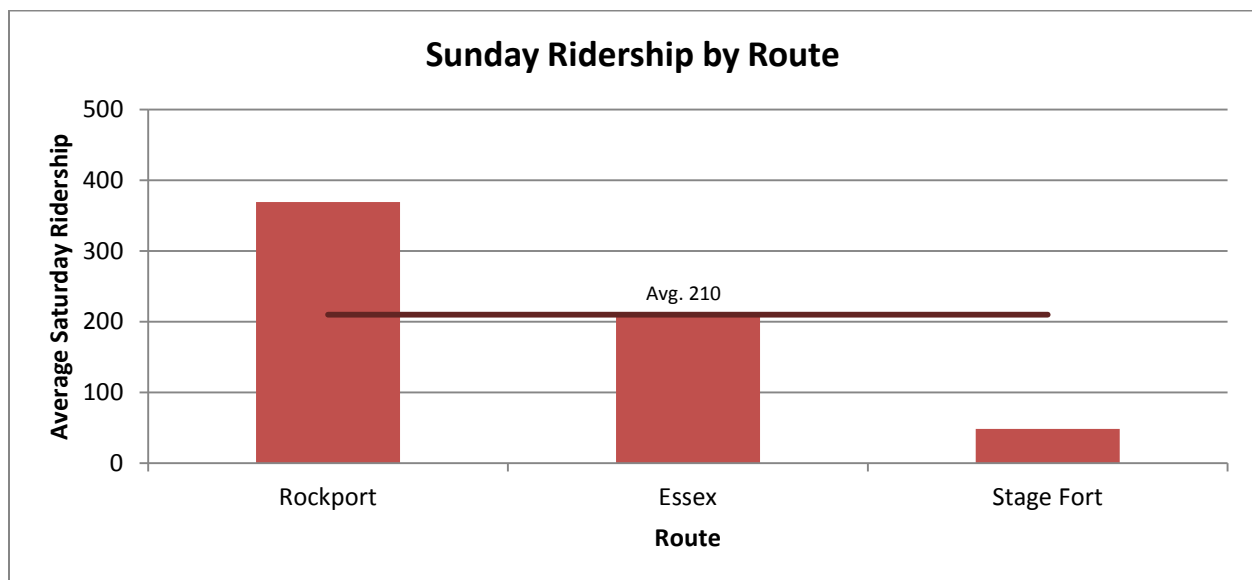


Figure 8. CATA Sunday Ridership by Route (FY 2014)

Like weekday ridership, weekend ridership decreased since FY 2012. Both Saturday and Sunday service experienced significant decreases in ridership from FY 2012 to FY 2013 of over 20 percent. While both services have been growing ridership in FY 2014, it is not enough to offset the losses in FY 2013. Overall,

Saturday ridership has decreased by 6.4 percent and Sunday ridership by 14.5 percent. While Saturday ridership decreased overall, year-round route ridership actually increased by two percent. Change by route is shown in Figure 9. Highest growth was seen on the Red route, which experienced a ridership increase of 67 percent. Seasonal routes saw a ridership decrease of ten percent. The Rockport route grew in ridership by 12 percent, Stage Fort lost 29 percent, and the Essex route lost 40 percent, ridership on these routes is heavily weather dependent and this may account for some the change in ridership among years. Figure 10 shows Sunday changes in ridership by route – all routes decreased in ridership.

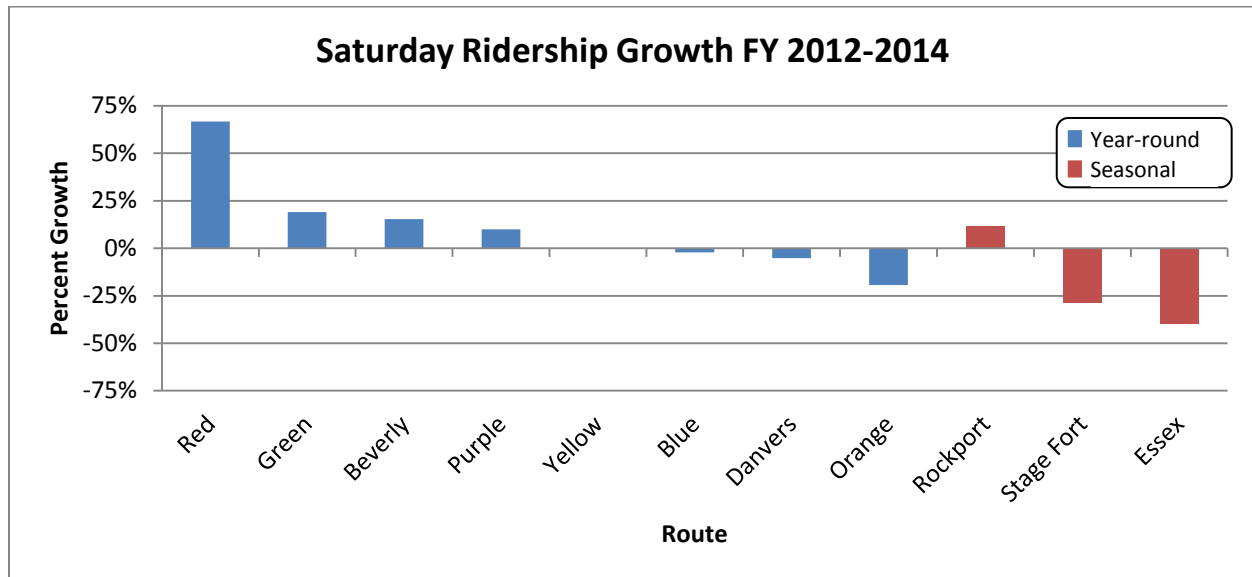


Figure 9. CATA Saturday Ridership Growth (FY 2012-FY 2014)

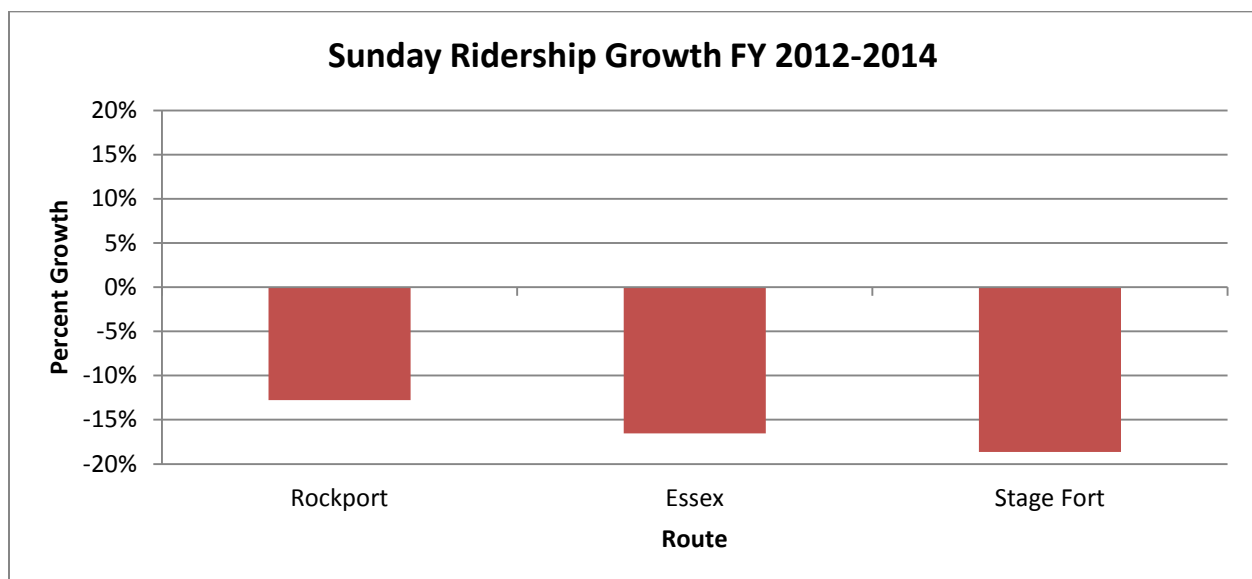


Figure 10. CATA Sunday Ridership Growth (FY 2012-FY 2014)

3.3 Service Operations

3.31 Revenue Hours

CATA runs 15,500 revenue hours each year, as shown in Figure 11. Overall, revenue hours decreased by 1.7 percent from FY 2012 to FY 2014. Table 4 summarizes the percent changes in revenue hours over the three fiscal years. On an average weekly basis, revenue hours decreased by two percent on weekdays with a decrease in service on the City of Beverly Shuttle. Saturdays saw a decrease in service on the City of Beverly Shuttle and an increase in service on the Rockport Loop and Essex Explorer for an overall service increase of two percent. Sunday saw an increase on the Rockport Loop and Essex Explorer for an overall service increase of nine percent.

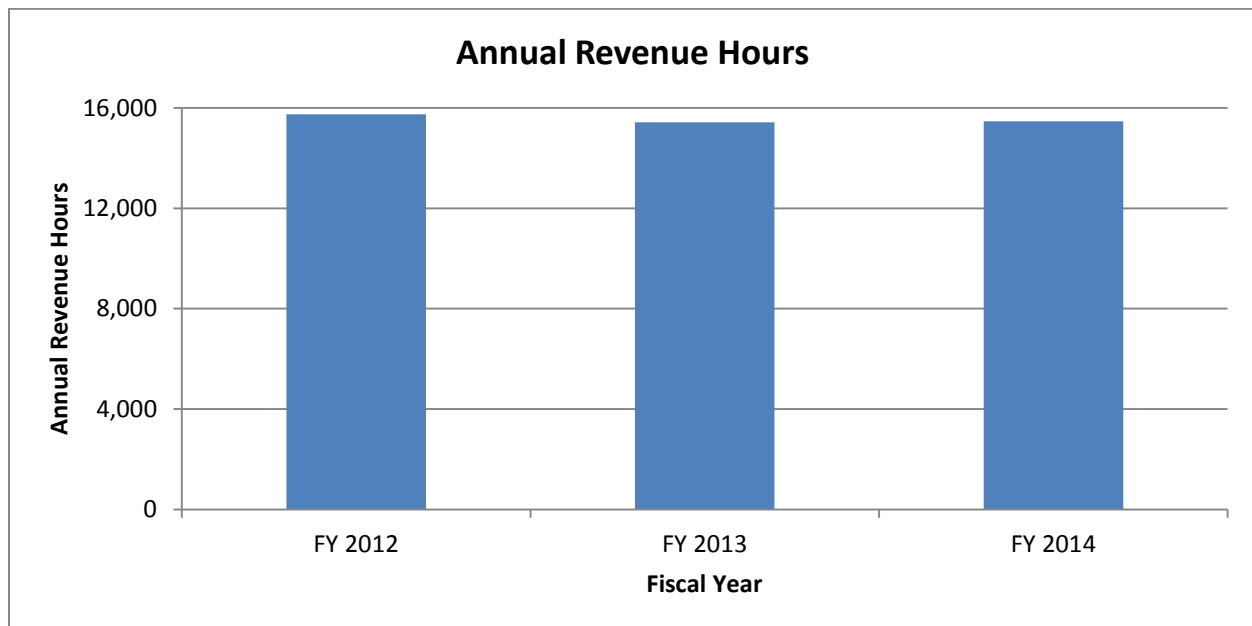


Figure 11. CATA Monthly Revenue Hours (FY 2012 – FY 2014)

Table 4. Rounded Percent Change in Revenue Hours by Day Type FY 2012 - FY 2014

Day Type	FY 2012-FY 2013	FY 2013-FY 2014	FY 2012-FY 2014
Weekday	-2%	0%	-2%
Saturday	-4%	7%	2%
Sunday	-2%	11%	9%
Total	-2%	0%	-2%

3.32 Revenue Miles

CATA service operates 250,000 revenue miles each year. Revenue miles decreased 2.2 percent from FY 2012 to FY 2014. From FY 2012 to FY 2014, weekday and Saturday miles decreased by two percent while Sunday miles increased by 14 percent. Figure 12 shows annual revenue miles for the past three fiscal years.

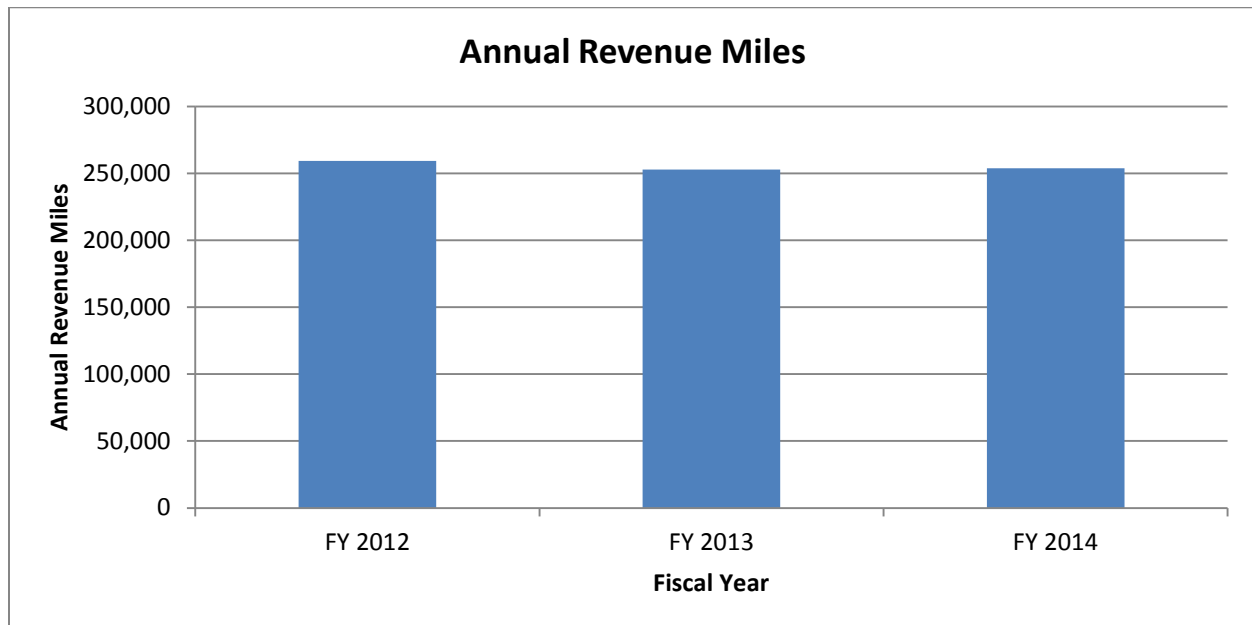


Figure 12. CATA Monthly Revenue Miles (FY 2012 – FY 2014)

3.33 Operating Costs

CATA operations cost \$2.5 million annually with an average hourly operating cost of \$160 in FY 2014. Figure 13 shows annual operating costs for the past three fiscal years.

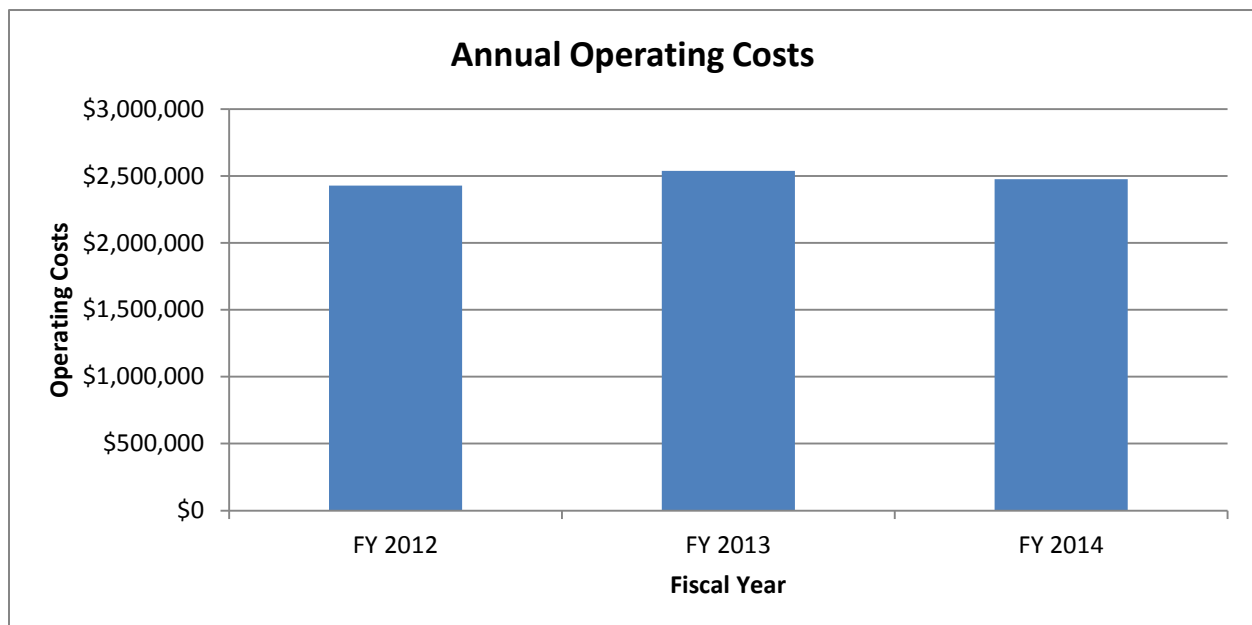


Figure 13. CATA Monthly Operating Costs (FY 2012 – FY 2014)

3.4 Service Productivity

3.41 System Productivity

Productivity measures the ridership generated per unit of service (revenue hours or revenue miles) and provides an understanding of the effectiveness of a route or transit network. Figure 14 shows that CATA's annual productivity over the last three fiscal years has declined. Productivity was 12.3 passengers per revenue hour in FY 2012, 12.4 in FY 2013, and 11.5 in FY 2014. The decrease in productivity comes from a small decrease in service hours coupled with a larger decrease in system ridership.

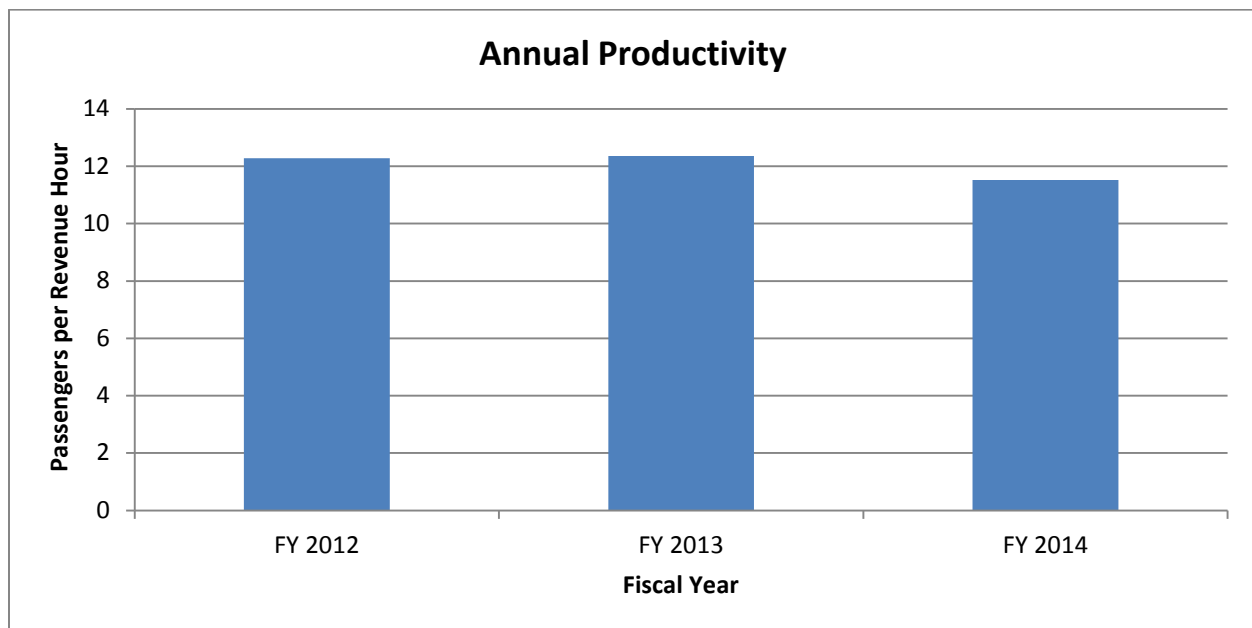


Figure 14. CATA Monthly Ridership per Revenue Hour (FY 2012 – FY 2014)

3.42 Weekday Productivity

CATA routes exhibit a wide range of performance as shown in Figure 15. Productivity for year-round routes averages 11.0 passengers per revenue hour. The route with the highest performance is the Orange route with 19.1 passengers per revenue hour while the route with the lowest performance is the City of Beverly Shuttle with 6.1 passengers per revenue hour. The top three performing routes (Orange, Blue, and Red) were also the top three routes by ridership, in the same order. The City of Beverly Shuttle was 4th in ridership but 7th in productivity. This trend suggests that the resources on this route are not being used as efficiently as possible, and there may be more service being provided than is warranted by the demand.

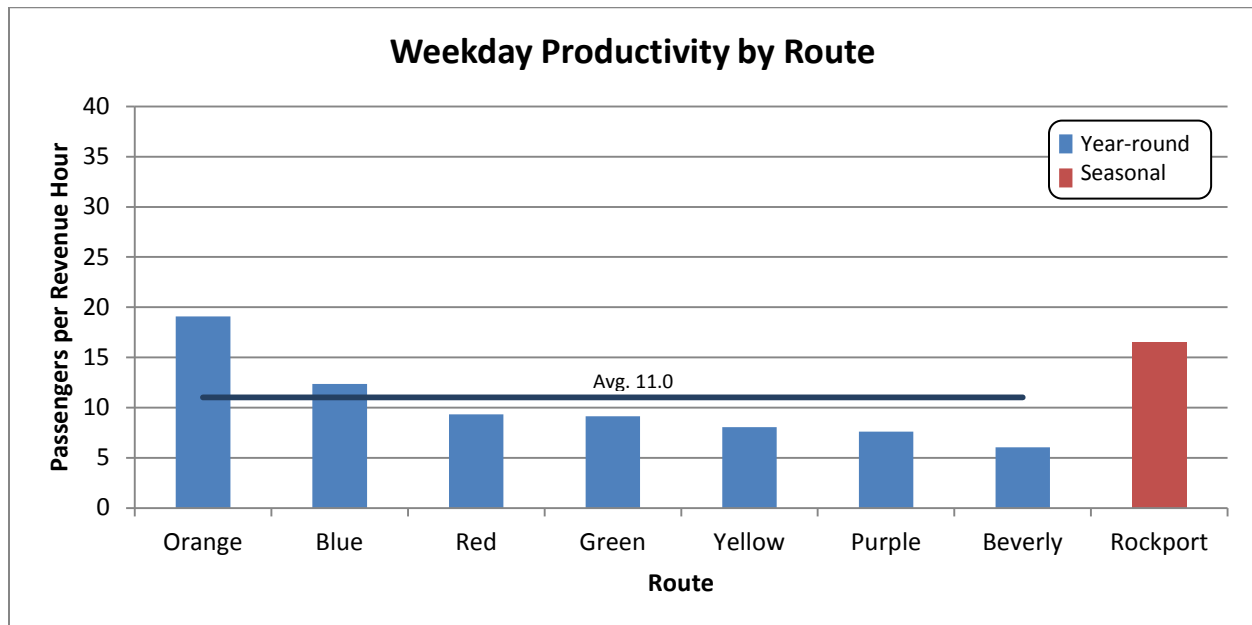


Figure 15. CATA Weekday Productivity by Route (FY 2014)

Figure 16 shows the percent change in productivity from FY 2012 to FY 2014 for routes in operation all three years. Only three routes experienced growth in productivity. The Purple route experienced the largest change in productivity, with a decrease of almost 100%. The change in productivity was solely due to a change in ridership, since service hours remained the same. Because ridership is low on this route, any fluctuation in ridership will greatly affect productivity.

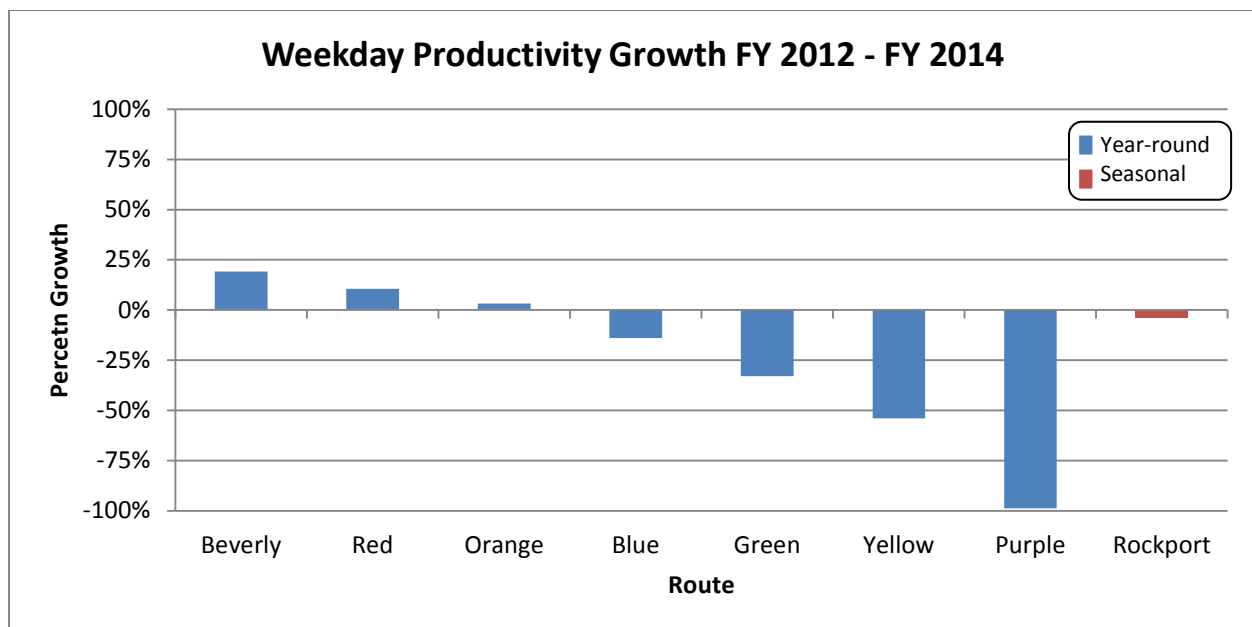


Figure 16. CATA Weekday Productivity Change (FY 2012 to FY 2014)

3.43 Weekend Productivity

On average, Saturday routes have stronger performance than weekday routes, with an overall average productivity of 13.6 passengers per revenue hour. However, performance for year-round routes is lower on Saturdays with 8.8 passengers per revenue hour. Seasonal routes have a much higher average of 19.0. The Rockport Loop has the highest productivity with 37.2 passengers per revenue hour while the City of Beverly Shuttle has the lowest productivity with 4.4 passengers per revenue hour. Figure 17 shows average Saturday productivity by route.

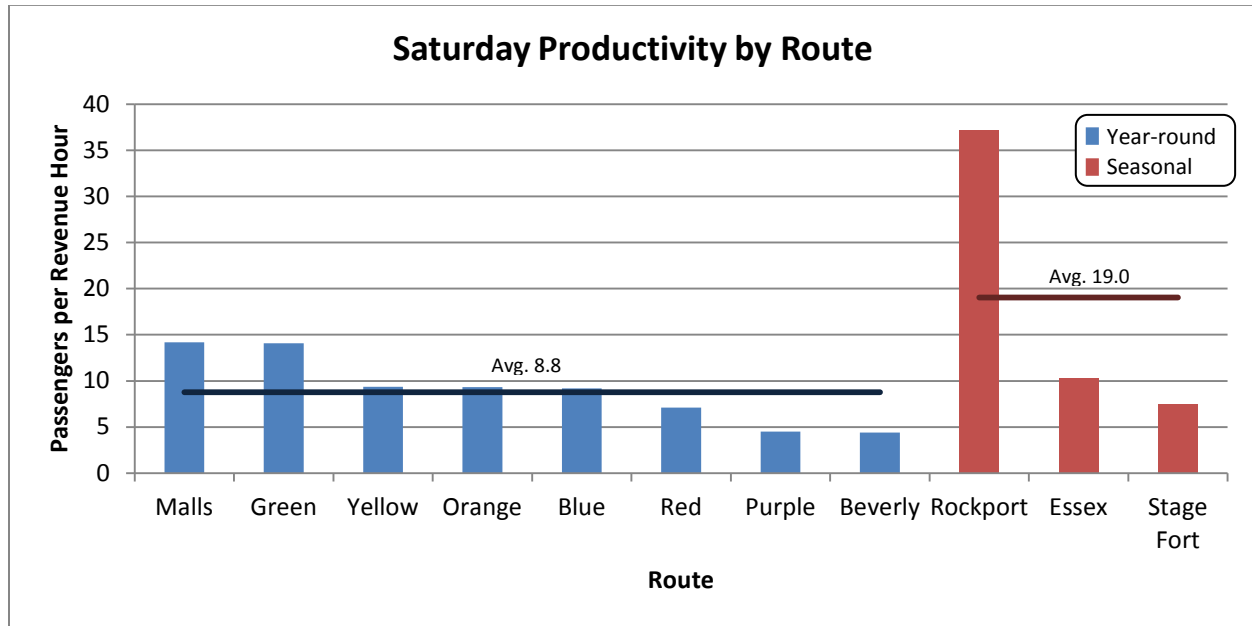


Figure 17. CATA Saturday Productivity by Route (FY 2014)

Half of year-round routes experienced a growth in service productivity from FY 2012 to FY 2014 while all seasonal routes saw a productivity decrease. The Red route had the highest growth of 67% while the Ipswich-Essex Explorer route had the lowest with a decrease of 44 percent.

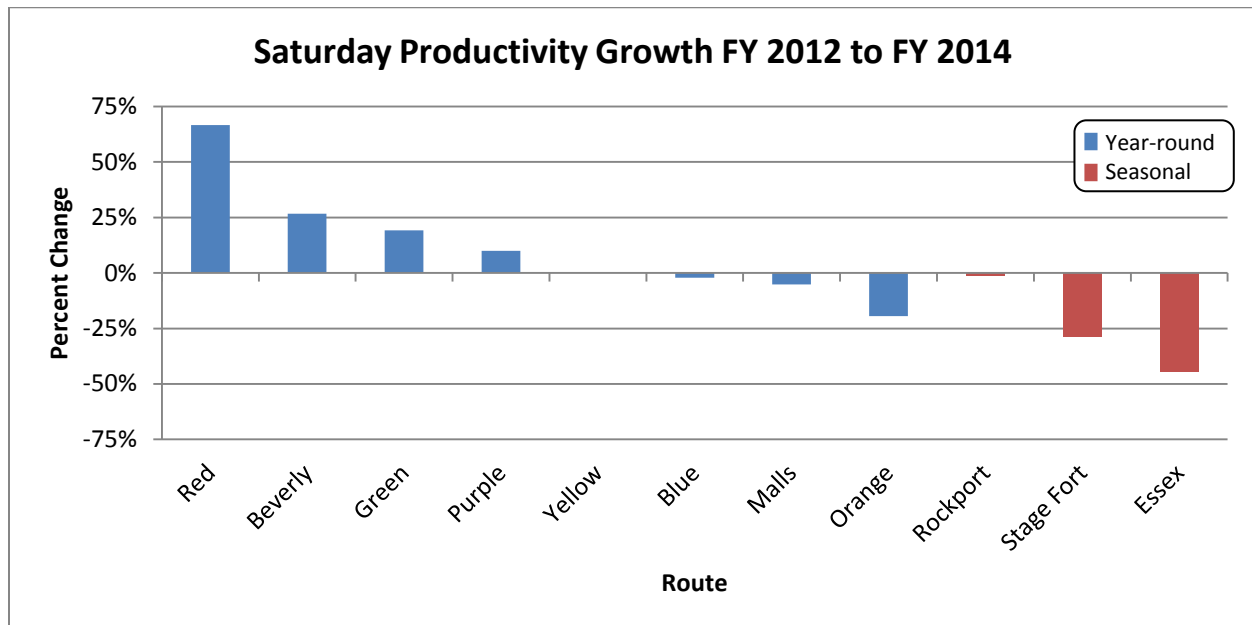


Figure 18. CATA Saturday Productivity Change (FY 2012 to FY 2014)

For seasonal routes, average Sunday productivity is similar to productivities seen on Saturdays. Productivity on the Rockport Loop decreases from Saturdays (37.2 pph) to Sundays (29.9 pph). Contrarily, productivity on the Ipswich-Essex Explorer increases from Saturdays (10.3 pph) to Sundays (14.9 pph). Productivity on the Stage Fort Trolley remains roughly the same. Figure 19 shows average Sunday productivity by route in FY 2014.

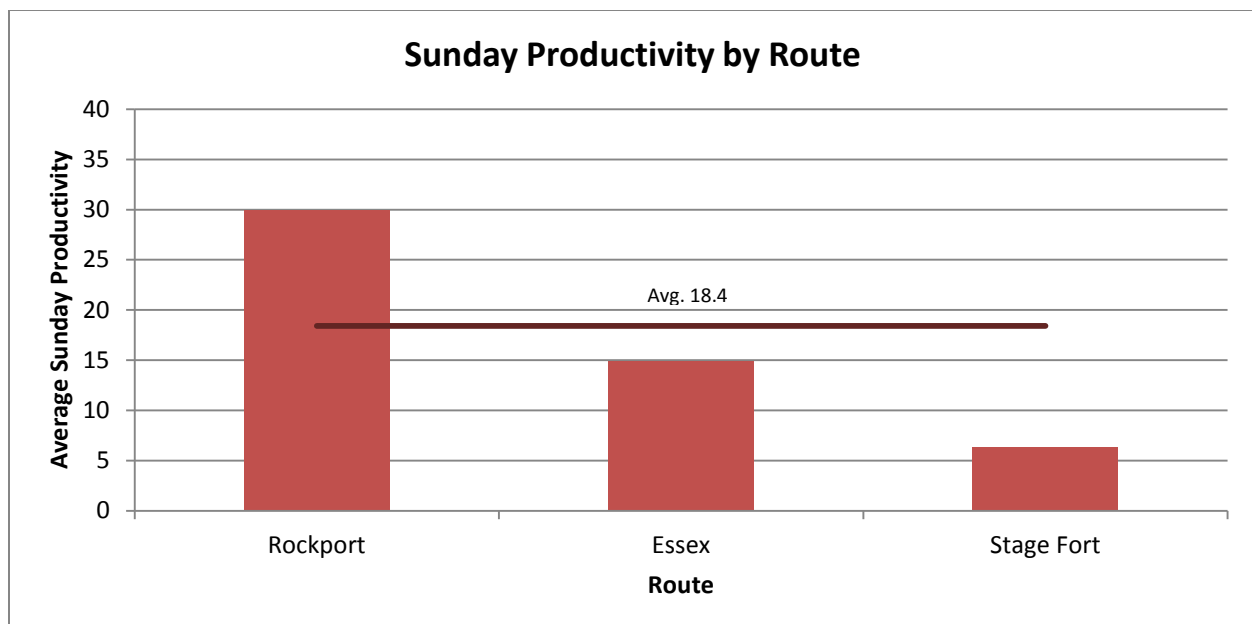


Figure 19. CATA Sunday Productivity by Route (FY 2014)

All Sunday seasonal routes decreased in productivity from FY 2012 to FY 2014, as shown in Figure 20. This is the result of a combination of an increase in service hours and a decrease in ridership.

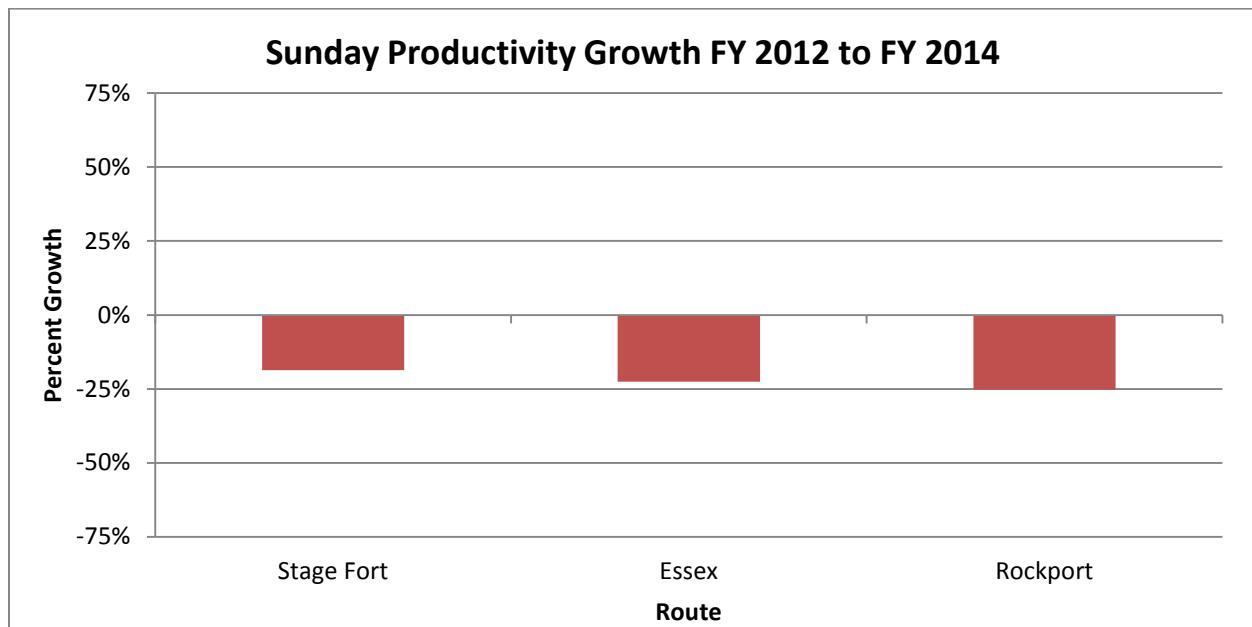


Figure 20. CATA Sunday Productivity Change (FY 2012 to FY 2014)

3.5 Financial Performance

3.51 System Farebox Recovery Ratio

The farebox recovery ratio is the ratio of fare revenue to operating costs. Higher ratios indicate higher cost-effectiveness and measure the portion of operating costs covered by passenger fares. The higher the farebox ratio, the lower the subsidy a route needs to operate, leaving more funding available to operate more service.

A decline in financial stability follows a decline in service productivity. Figure 21 shows that farebox recovery has decreased only slightly over the past three fiscal years, remaining effectively flat between FY 2013 and FY 2014. The average farebox recovery ratio was 7.9 percent in FY 2012 and 7.3 percent for both FY 2013 and FY2014. Farebox recovery decrease is related to the observed system wide decrease in ridership.

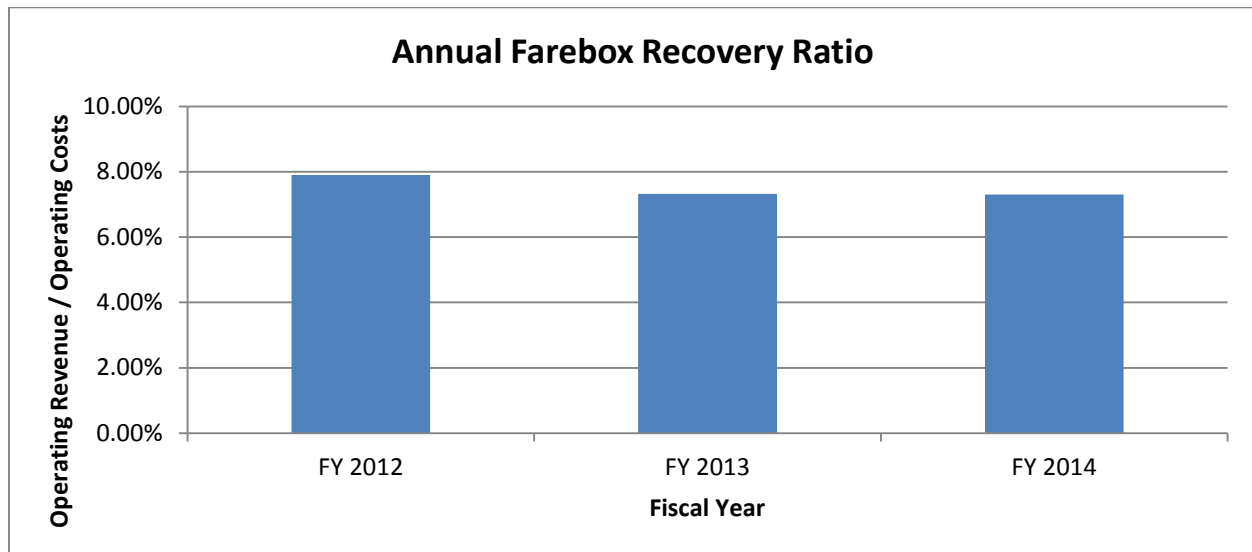


Figure 21. CATA Annual Farebox Recovery (FY 2012 – FY 2014)

3.52 System Subsidy per Passenger

Subsidy per passenger measures how much it costs to operate a route on a “per passenger” basis. It is calculated by subtracting passenger revenue from operating cost and dividing by the total number of passengers. Lower passenger subsidy values indicate that a greater portion of operating costs are recovered through passenger fares, and are more desirable for financial sustainability.

Figure 22 shows that subsidy per passenger has increased slightly over the past three fiscal years. The average subsidy per passenger was (\$11.58) in FY 2012, (\$12.35) in FY 2013, and (\$12.88) in FY 2014.

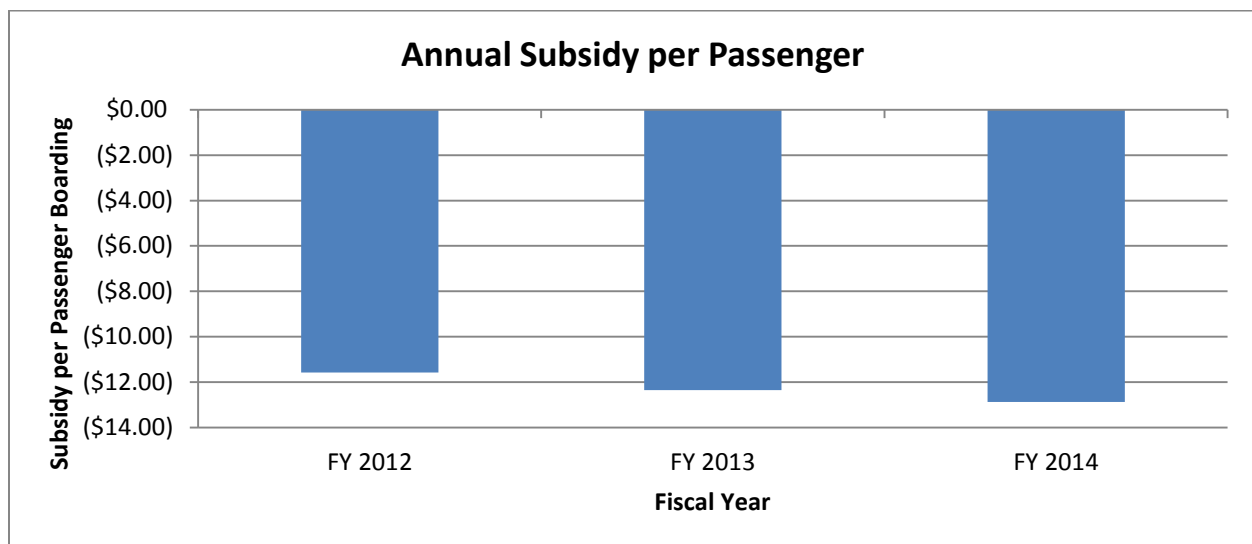


Figure 22. CATA Annual Subsidy per Passenger (FY 2012 – FY 2014)

3.53 Weekday Subsidy per Passenger

The average weekday subsidy per passenger on year-round routes is (\$13.64). The Orange and Rockport Loop routes have the lowest subsidies which are close to (\$8.00). The City of Beverly Shuttle has the highest subsidy with (\$26.06) per passenger. While this number appears high, it is important to mention that the City of Beverly subsidizes the route in order to keep the fare low at \$0.50. The calculation of subsidy per passenger does not account for external funding. Figure 23 shows average subsidy per passenger by route on weekdays.

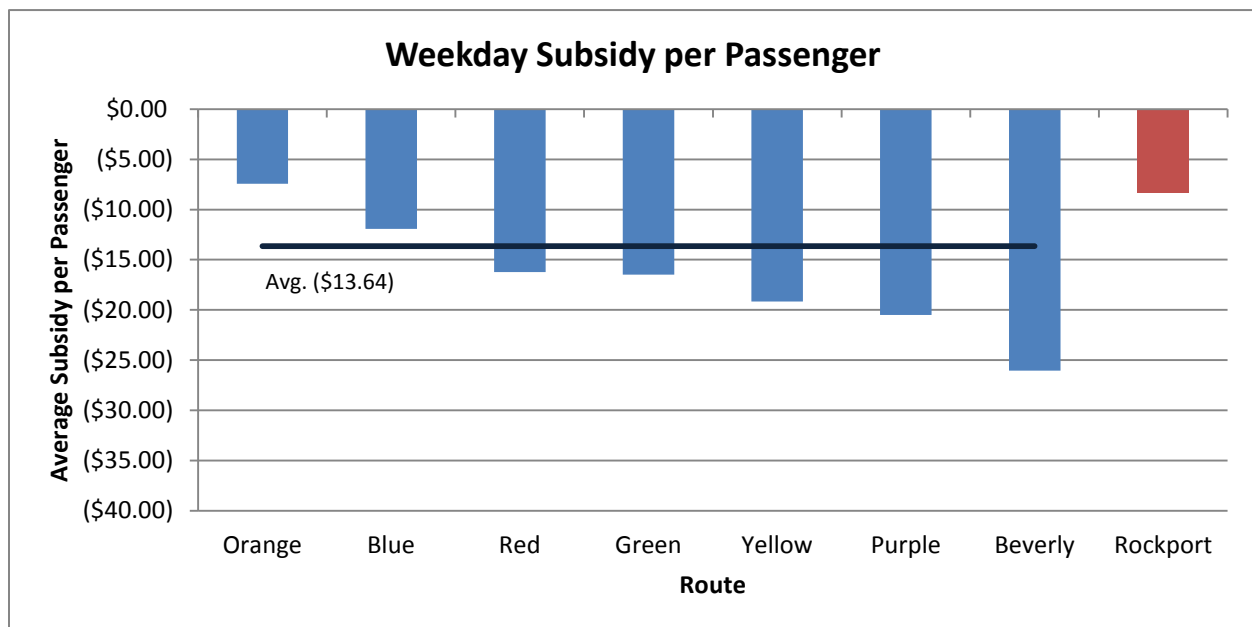


Figure 23. CATA Weekday Subsidy per Passenger (FY 2014)

3.54 Weekend Subsidy per Passenger

The average Saturday subsidy per passenger is (\$10.28), and the average is (\$16.91) for year-round routes and (\$6.78) for seasonal routes. The Rockport Loop has the lowest subsidy in the system of (\$2.89) while the City of Beverly Shuttle has the highest subsidy of (\$36.10). Figure 24 shows average Saturday subsidy per passenger by route in FY 2014.

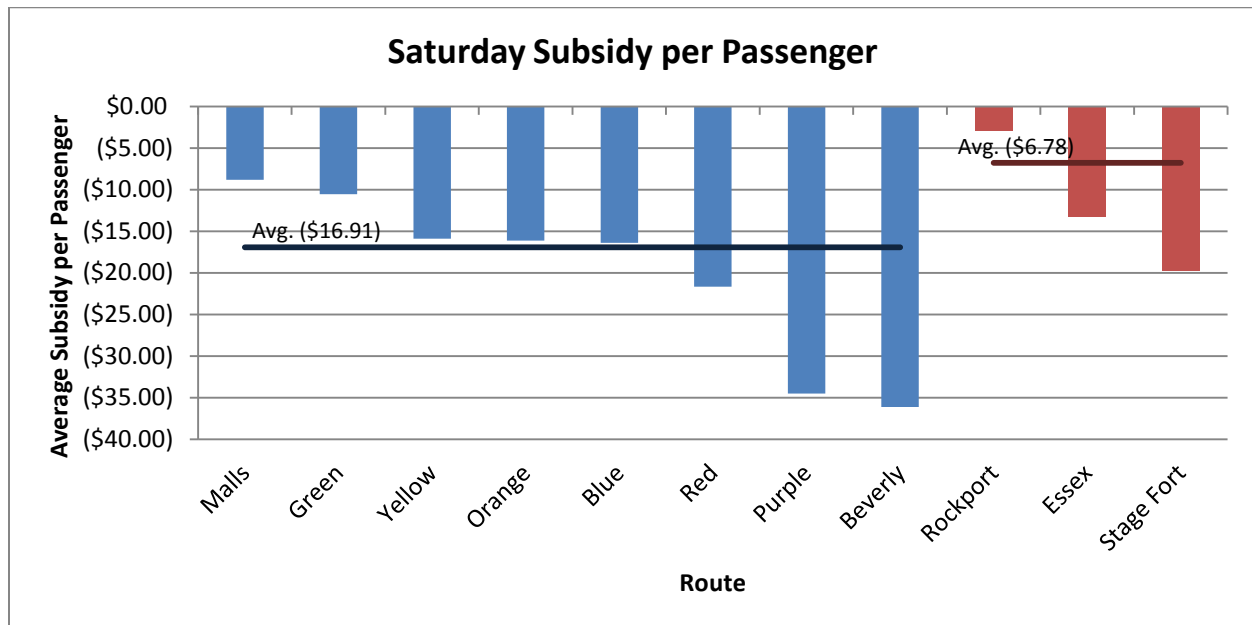


Figure 24. CATA Saturday Subsidy per Passenger (FY 2014)

The average Sunday subsidy per passenger is (\$6.97). The Rockport Loop has the lowest subsidy of (\$3.90) while the Essex Explorer route has the highest subsidy of (\$37.62). Figure 25 shows average Sunday subsidy per passenger by route in FY 2014.

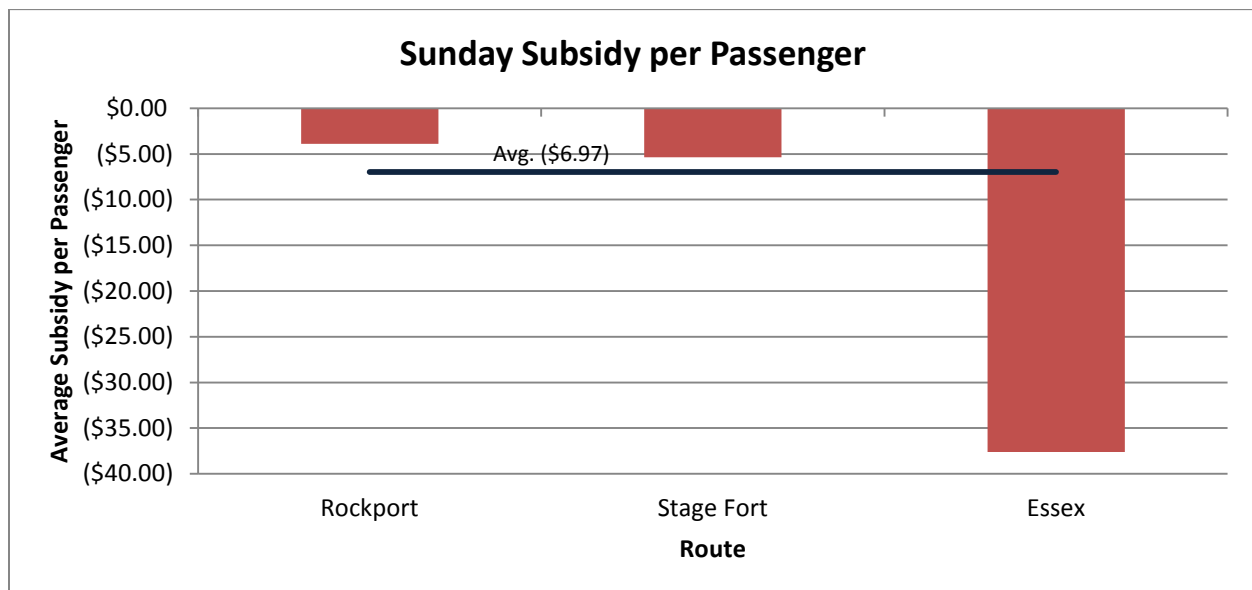


Figure 25. CATA Sunday Subsidy per Passenger (FY 2014)

3.6 Service Frequency

Frequency refers to how often a bus serves a particular route. Service frequencies affect how passengers use the system and the flexibility they can have when making travel plans. Year-round services have low frequencies, with no services operating more often than every 60 minutes. Some trips operate as much

as five hours apart. Seasonal weekend services have higher frequencies ranging from 20 to 60 minutes. The most successful route, the Rockport Loop, operates every 20 minutes. Low frequencies lead to lower ridership as passengers have to plan their entire days around bus trip times.

3.7 Ranking of Weekday Route Performance

In order to evaluate investment priorities, the routes were given a score based on how their performance compared with system averages. Routes were scored based on ridership, passengers per revenue hour, and subsidy per passenger. For each route, each performance indicator was evaluated as a percentage of the system average. For example, if the system average was 100 passengers and a given route has 200 passengers, it would score 200% for that category. The composite score was calculated by taking the averages of the percentages for each category. The routes were then divided into four tiers based on their composite score: Highest performers (150% or greater), above average performers (149%-100%), below average performers (99%-50%), poor performers (49% or lower). Table 5 shows each route in CATA and its composite score and ranking for weekdays and Table 6 shows the rankings for Saturdays.

Table 5. CATA Weekday Route Performance Ranking

Rank	Route	Route Description	Score
1	Orange	Gloucester Crossing & Business Express Loop	185%
2	Rockport	Blue Gate Meadows Parking Lot	149%
3	Blue	Gloucester to Rockport via Lanesville	121%
4	Red	Gloucester to Rockport via Thatcher Road	79%
5	Green	Gloucester to Rockport via Eastern Avenue	71%
6	City of Beverly Shuttle	City of Beverly Shuttle	58%
7	Yellow	Gloucester to Magnolia	53%
8	Purple	Gloucester to West Gloucester	52%

Table 6. CATA Saturday Route Performance Ranking

Rank	Route	Route Description	Score
1	Rockport	Blue Gate Meadows Parking Lot	391%
2	Ipswich-Essex Explorer	Ipswich-Essex-Crane Beach	115%
3	Malls	Gloucester to Danvers and Peabody	108%
4	Green	Gloucester to Rockport via Eastern Avenue	85%
5	Orange	Gloucester Crossing & Business Express Loop	64%
6	Blue	Gloucester to Rockport via Lanesville	60%
7	Stage Fort	Stage Fort Park to Rocky Neck	58%
8	Yellow	Gloucester to Magnolia	45%
9	Red	Gloucester to Rockport via Thatcher Road	41%
10	City of Beverly Shuttle	City of Beverly Shuttle	39%
11	Purple	Gloucester to West Gloucester	24%

Investment strategies for routes will vary based on their performance tier. The routes with the highest performances are top priorities for service investment and may benefit from increased service

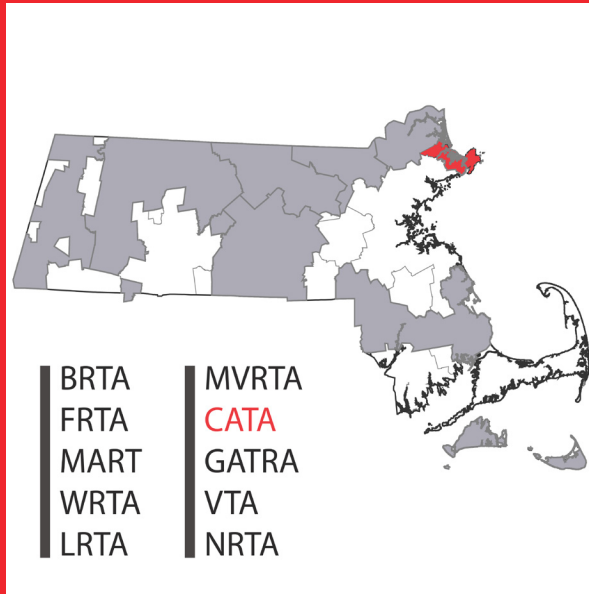
frequencies or service spans. The other routes that perform above average are candidates for further service investment as resources become available.

For routes that perform below average, further analysis is required to determine what is causing the routes to have low performance. More in depth analysis could look at inefficiencies in route alignments, service frequencies and spans, and duplicity with other routes. Routes with exceptionally low performance may be candidates for discontinuation of service and will be examined in later sections.

3.8 Key Findings

- Overall, ridership decreased by eight percent from FY 2012 to FY 2014.
- The Orange route is the strongest weekday route, accounting for one third of year-round weekday ridership. The Mall Shuttle is the strongest year-round Saturday route, while the Rockport Shuttle is the strongest Saturday route overall.
- The Yellow, Purple, and City of Beverly routes are consistently among the lowest performing routes in all categories.
- CATA has had few service changes over the last three fiscal years. Only two routes experienced a change in service levels: The City of Beverly Shuttle, and Rockport Loop.

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Chapter 4

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4. DETERMINING DEMAND

In order to evaluate a transit system and identify possible ways to strengthen it, it is important to understand the surrounding market, how this market is evolving, and who the riders of the system are. Demographics, land use, and socioeconomics – all of which impact ridership – are constantly changing. To align service to meet the needs of these potential riders, it is important to understand the level of transit demand that they represent.

This chapter is divided into two parts. The first section examines regional job creation goals and employment needs to demonstrate the economic context of the region and to identify potential ridership growth areas. The second section seeks to determine how Cape Ann Transportation Authority's (CATA) current service aligns with its regional transit demand.

4.1 Regional Job Creation Goals and Employment Needs

This section will examine economic growth in the region to determine job creation goals and employment needs as well as the role transit plays in accommodating these needs. To determine the region's job creation goals and employment needs, the Strategic Plan of the Commonwealth of Massachusetts Executive Office for Housing and Economic Development (EOHED) was reviewed to examine the overarching goals for the state. Next the census economic data was reviewed to determine the economic context, how and where the region is expected to grow, and identify major employers/industries. This information was supplemented by site visits and interviews with CATA staff.

4.11 EOHED Strategic Plan

The EOHED plays a crucial role in supporting the growth of the economy, vibrant communities, and competition for consumers and businesses. The office, led by the Secretary of Housing and Economic Development, is focused on steering Massachusetts towards smart growth, a development approach that recognizes the interactions between land use, energy, and transportation. To achieve this, the EOHED has outlined a three-year strategic plan that focuses on the following four goals:

1. Accelerated job creation;
2. Stabilized housing;
3. Enhanced consumer awareness; and
4. Improved regulatory solutions.

As the economy transitions from health care, higher education, technology, financial services, and tourism to one that includes life sciences, clean energy, and the creative economy, more jobs will be added. Accelerating job creation in conjunction with compact land use development patterns that promote sustainability and increase the number of affordable housing units will change residential patterns and transportation needs. To serve the needs of the new emerging clusters of employment and

housing, the transportation system as a whole must change and adapt. The new environments, which will be comprised of small and mid-sized businesses, must be served by public transit in order to meet the demands of the new workforce. While the public transit system must adapt to the changing economy, it should be noted that no two regions of the state are the same. As such, job creation goals and employment needs – and thus transportation needs – will differ.

4.12 Cape Ann Economic Development

Four communities – Essex, Ipswich, Gloucester, and Rockport – make up the CATA service area. These four communities are part of the Metro Area Planning Council (MAPC), the regional planning agency which serves 101 communities in Metro Boston. Due to its size, MAPC is divided into eight sub-regions which allow similar communities to work collaboratively on issues specific to their region. All four CATA communities are members of the North Shore Task Force.

The Cape Ann region is restricted by ocean on at least three sides. Rockport and parts of Gloucester are located on an island, with access limited to two bridge crossings. Deteriorating bridge conditions have limited access for large vehicles to the Route 128 Bridge, the primary access to the island. Ipswich and Essex are not part of the island, and the primary access for these communities is Route 133. The Region has a population of 50,852, with 57.4% of the population living in Gloucester. The smallest community is Essex with a population of 3,520 and a density of 301 people per square mile. Density in the areas ranges from that of Essex to 1,098 people per square mile in Gloucester.

With affordable housing and the commuter rail stations in Ipswich, West Gloucester, Gloucester, and Rockport, this region serves as a bedroom community for the Metro Boston region. In recent years, however, there has been an influx of reverse commuters who are living in Metro Boston and working in the Cape Ann region. The largest of the three train stations is Gloucester Station with 690 average weekday boardings. Between 3.9% and 6.6% of work trips in the region utilize public transit (bus or rail). According to the 2012 American Community Survey 5-Year Estimates, 6.9% of households in the region do not have a vehicle, which is a lower rate than both state and national averages (Table 7). Gloucester has the greatest percentage of zero-vehicle households at 8.8% but has the smallest percentage of work trips made via public transit with just 3.9%.

Table 7. Vehicles per Household

	Cape Ann Region	State	U.S.
0 Vehicle Households	6.9%	12.5%	9.0%
1 Vehicle Household	31.4%	35.9%	33.7%
2 + Vehicle Household	61.7%	51.6%	57.3%

Median household income values differ among the communities in the Cape Ann region. Ipswich and Essex have the highest incomes, which averages between \$73,000 and \$74,000. This is well above the

state average of \$65,339. Rockport and Gloucester, however, both fall slightly below the state average with median household incomes of \$61,000 and \$63,000, respectively.

Cape Ann is a region of changing economy. Historically home to an economy based on a fishing and shipping port, then on granite mining, the region is slowly evolving. While still home to a crucial port, the region's main economic drivers and employers are no longer maritime-related, as the commercial fishing industry continues to decline nationwide. For all four communities, the most common industries are education, healthcare, and professional/scientific technical services. Other important industries include manufacturing and construction. Collectively, there are more than 7,000 employers in the region ranging in size from one to 1,000 employees for a total workforce of 28,500 employees. More than half of these jobs are located in Gloucester. There are 28 employers in the region with more than 100 employees, and 82 employers with 50-99 employees. The largest percentage, 58.5%, of these large employers are located in Gloucester. The three top employers in the region are Ebsco Information, an information services company with over 1,000 employs in Ipswich; the Addison Gilbert Hospital with more than 500 employees in Gloucester; and the Seaport Grille with between 250 and 500 employees in Gloucester. Other major employers include Gorton's of Gloucester, Applied Materials and the National Oceanic and Atmospheric Administration (NOAA)².

Unemployment rates in the region have followed similar trends to those of the state and country. The unemployment rates within the region are currently lower than the nation average and range from 3.6% in Ipswich to 5.9% in Gloucester. Historical trends show that in Gloucester unemployment rates spike during the winter, which can be attributed to the seasonality of the tourism industry.

Rockport and Gloucester have fixed-route bus service, while Ipswich and Essex receive seasonal weekend service during the summer months and a dial-a-ride service for persons 60 years of age or older year-round. While CATA only transports approximately 200,000 passengers annually, the system plays a crucial role in reducing traffic in the downtown cores of Rockport and Gloucester and transporting tourists during the summer months. Tourism has become a large part of the economy for the region, with hundreds of support industries such as shops and restaurants. Shuttles are provided from nearby parking lots, from the train station to the beaches, and around downtown when cruise ships are in port. In addition to the tourist shuttles, the system stems out from central Gloucester and circumnavigates the island, serving transit-dependent populations throughout the year.

4.2 Transit Market Analysis

Certain groups, such as older adults, the young, low income populations, and those without access to a vehicle, are more likely to use transit, and quite often their trips are for work purposes. By analyzing and examining such factors as age, population density, employment density, income levels, and vehicle

² Employment size for these employers could not be verified through the Massachusetts Executive Office of Labor and workforce Development Labor Market Information.

availability, transit-dependent populations within the region were identified (Section 4.21). This information was then combined with additional attributes such as land use and amenities to determine an overall market and demand for transit in the region (Section 4.22). To determine if service was currently deployed in the most effective way to accommodate the transit needs of the region's workforce, each route was mapped and overlaid on maps displaying employment and socio-economic data (Section 4.23).

4.21 Transit Dependent Populations

Transit-dependent populations are those exhibiting socioeconomic and demographic characteristics that make them more likely to use public transit than others, such as level of income, access to a vehicle, and age. Transit systems are often designed with a focus on serving such populations. In addition, population and employment densities can also provide an indication to the feasibility of providing service. Industry standards indicate that at least 2,000 households are needed per square mile to support a fixed-route transit system. It is important to match the level of demand with the level of service as it is expensive to run a transit system.

Older Populations

According to the American Public Transportation Association (APTA), individuals aged 65 and above represent the second largest transit user group³. This group's high level of transit ridership, however, is disproportional to the relatively small percentage of the population that the group represents. Senior population typically correlates with areas of low income levels and vehicle ownership. These individuals are often on fixed incomes, which reduces their desire to own a vehicle. Additionally, health issues such as poor eyesight can deter them from driving. Within the CATA service area, 18.5% of the population is made up of individuals over the age of 65, but there is not distinct pattern as to where this age group tends to live (Figure 26). Thus, it can be challenging to institute transportation services that meet their needs.

³ This based on the proportion of individuals in in this age class who use transit and not the proportion of transit riders who are in this age class.

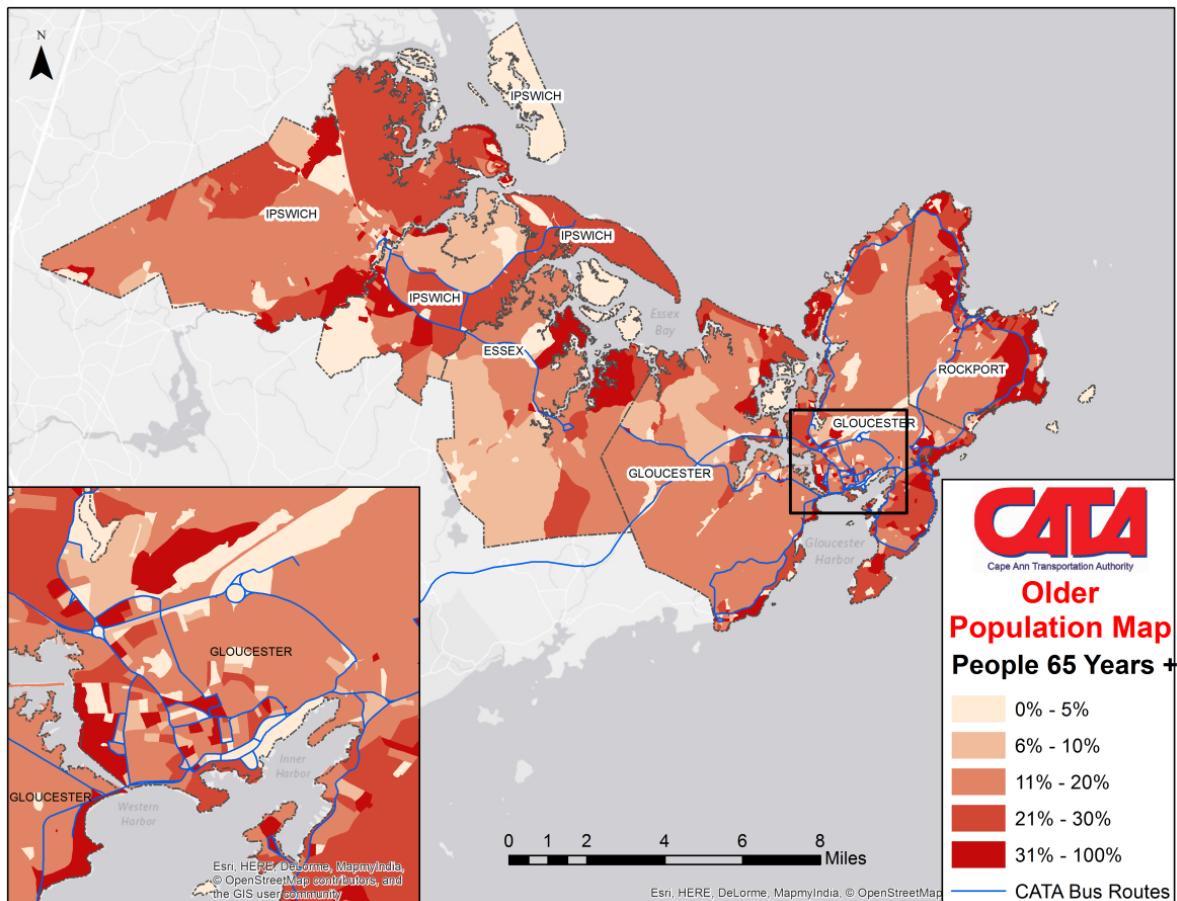


Figure 26. Older Populations

Population Density

The majority of trips (transit or non-transit) originate or end at the home, making population an important indicator of potential transit use. Population density is used in this analysis instead of the total population because it accounts for varying area sizes. High density areas are typically found in urban centers consisting of multifamily units, mixed-use developments, limited parking, and walkable environments, all of which generate higher transit ridership. The average population density in the Cape Ann Region is 657 persons per square mile, which is lower than the state average of 858 persons per square mile. The densest areas are located in Gloucester, with pockets of density in Rockport and Ipswich (Figure 27). Many of the dense population areas are served by CATA routes, with the exception of Ipswich.

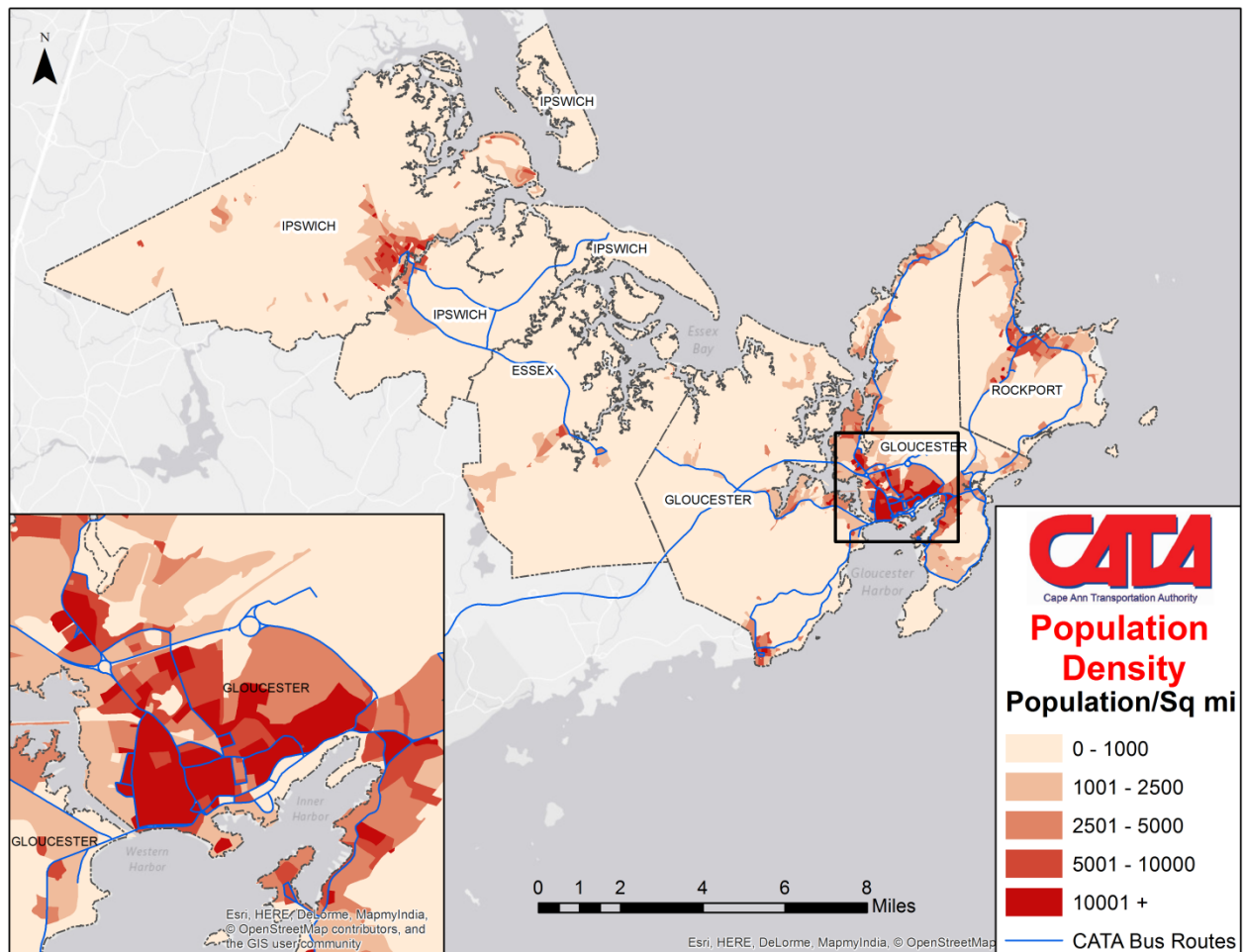


Figure 27. Population Density

Employment Density

According to APTA, commuting for work purposes is the number one reason people take transit. As such, it is imperative that transit systems serve areas with high concentrations of employment. Within the CATA service area, there are 21,198 jobs, which equates to an average of 266 jobs per square mile. Employment centers tend to be concentrated in the city centers or in industrial parks. Many of the dense employment areas in Gloucester and Rockport are served by CATA (Figure 28).

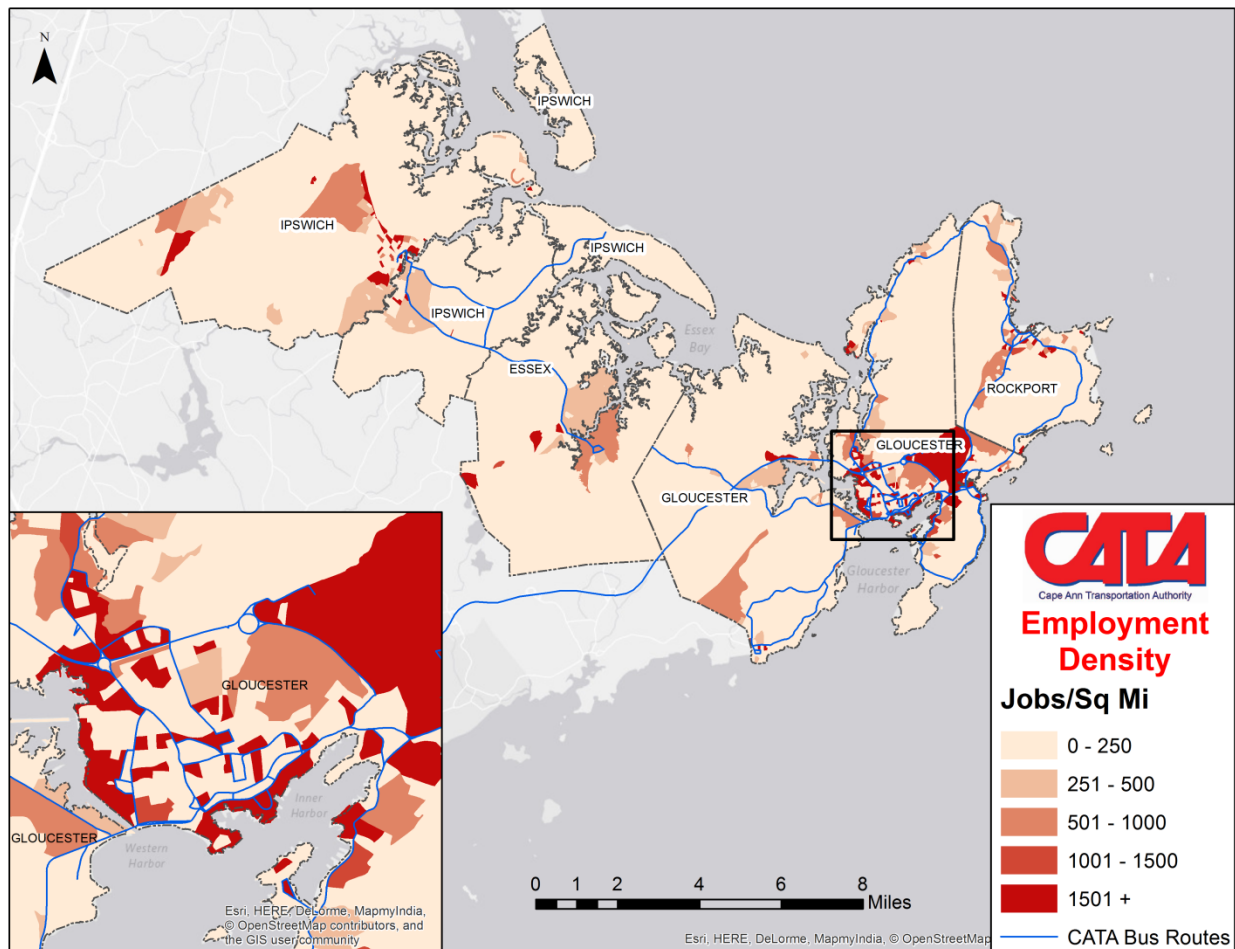


Figure 28. Employment Density

Home and work are the most common origin and destinations according to APTA. Since population and employment densities are the best approximation for determining the level of demand, these two variables have been combined to examine service frequencies based on thresholds.⁴ As job and population densities increase, the headway for transit service should decrease (Table 8). Densities above 250,000 are candidates for alternative modes such as bus rapid transit (BRT) or rail. Figure 29 indicates that the demand for more frequent service is concentrated in the cores of Gloucester, Ipswich, and Rockport.

⁴ These estimates are based on data from the *Urban Development Intensities in the Washington DC Metropolitan Area* by Terry Holzheimer, *Public Transportation and Land Use Policy* by Boris Pushkarev, and *TCRP Report 111 Elements Needed to Create High Ridership Transit Systems*.

Table 8. Frequency Thresholds

Jobs & Population per Square mile	Fixed-Route Headway
3,000-6,500	60 Min
6,501-16,000	30 Min
16,001-250,000	15 Min
250,001+	5 Min

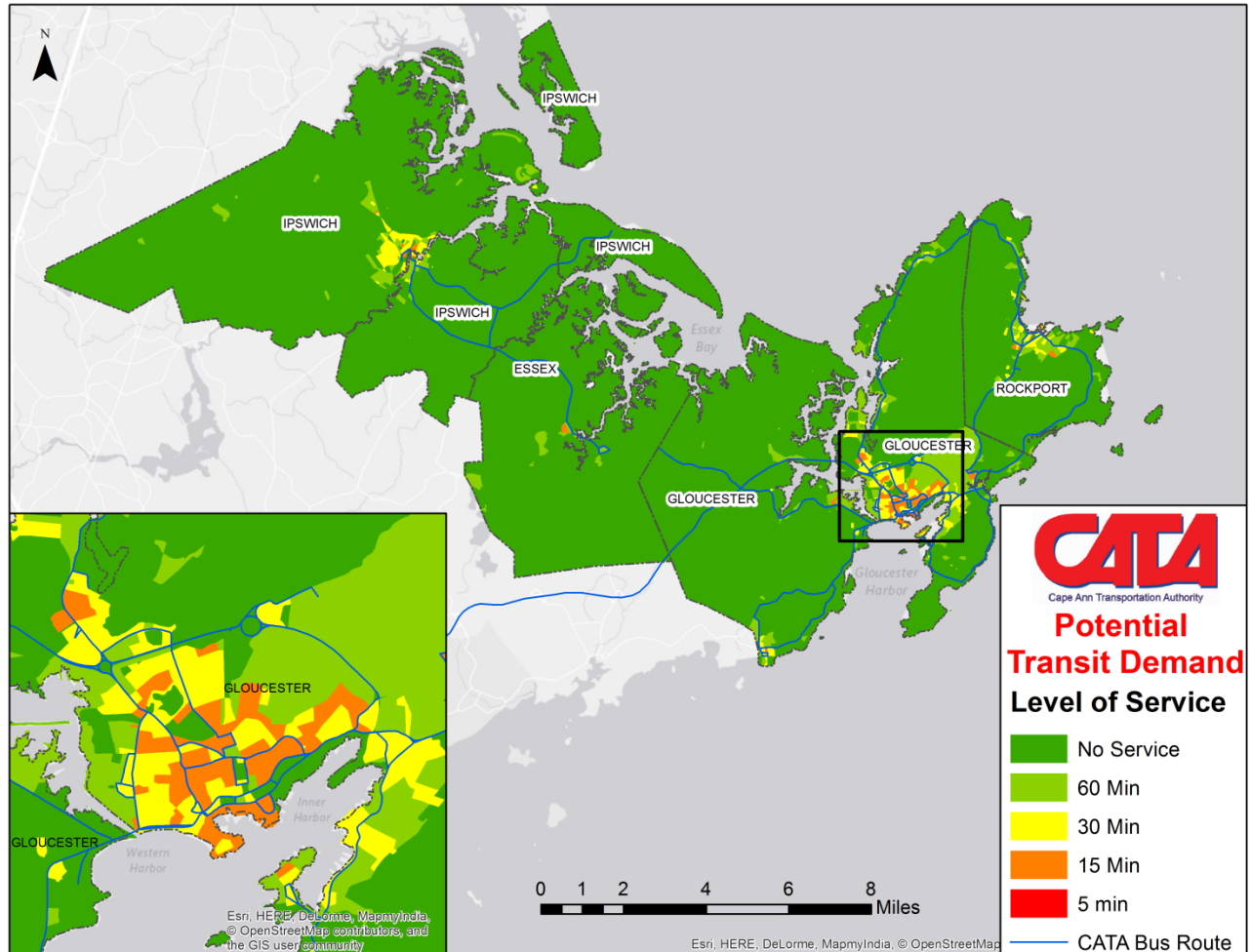


Figure 29. Transit Demand - Level of Service

Income Level

Median household income is used as a measure for propensity to use transit. Automobile ownership is expensive and as household incomes decline so does the likelihood of having access to a private vehicle. Work-trip market shares from the American Community Survey show that as income rises, the percentage of people using transit decreases. The average median household income in the Cape Ann

Region is \$72,074. Despite this average, however, there are some areas in the region, especially within Gloucester, with substantially lower income levels (Figure 30).

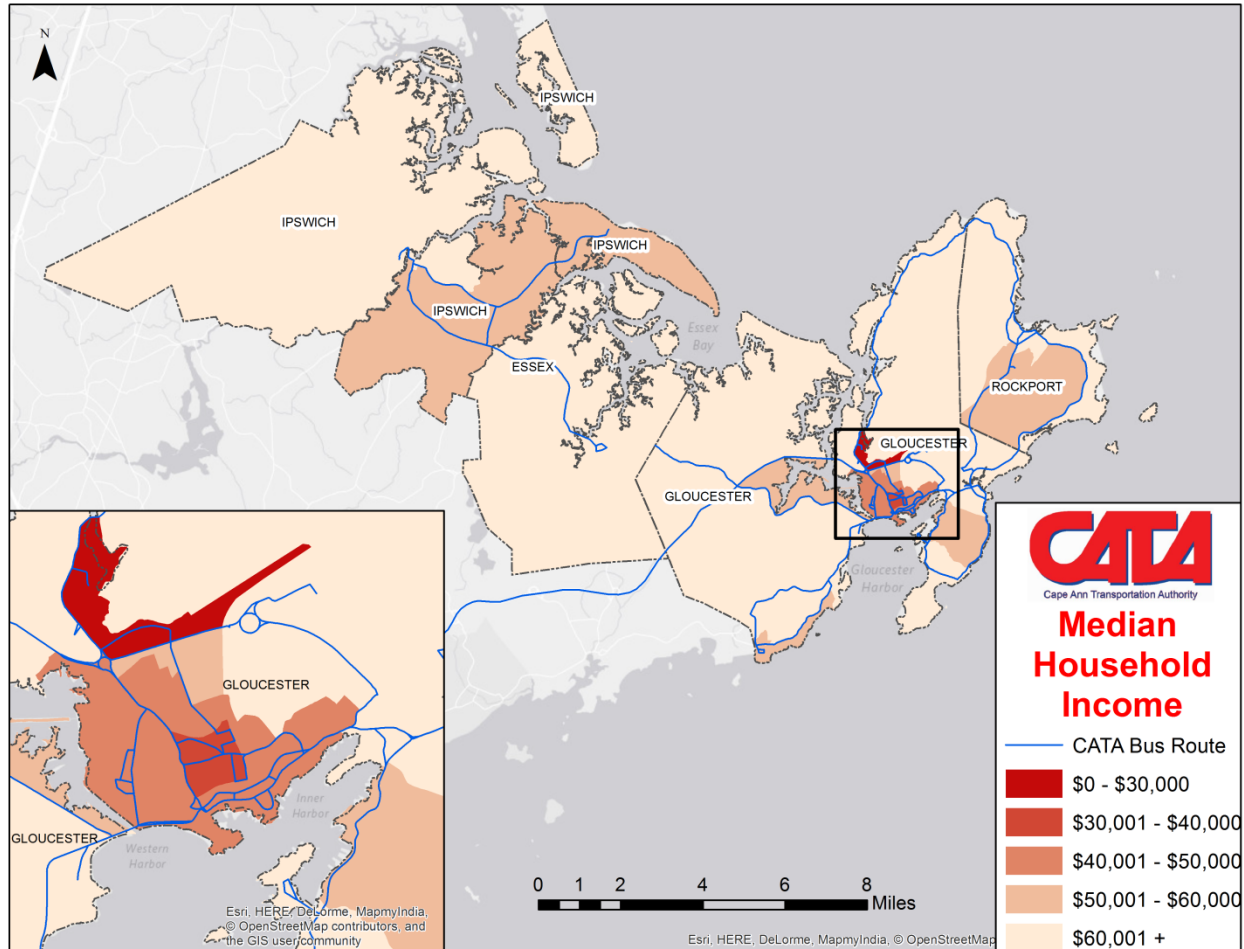


Figure 30. Median Household Income

Zero-Vehicle Households

The CATA system serves an area where 5.8% of households do not have access to a personal vehicle. Concentrations of these households coincide with low-income populations areas shown on the previous map. Figure 31 depicts these zero-vehicle household areas, which are more concentrated in Gloucester.

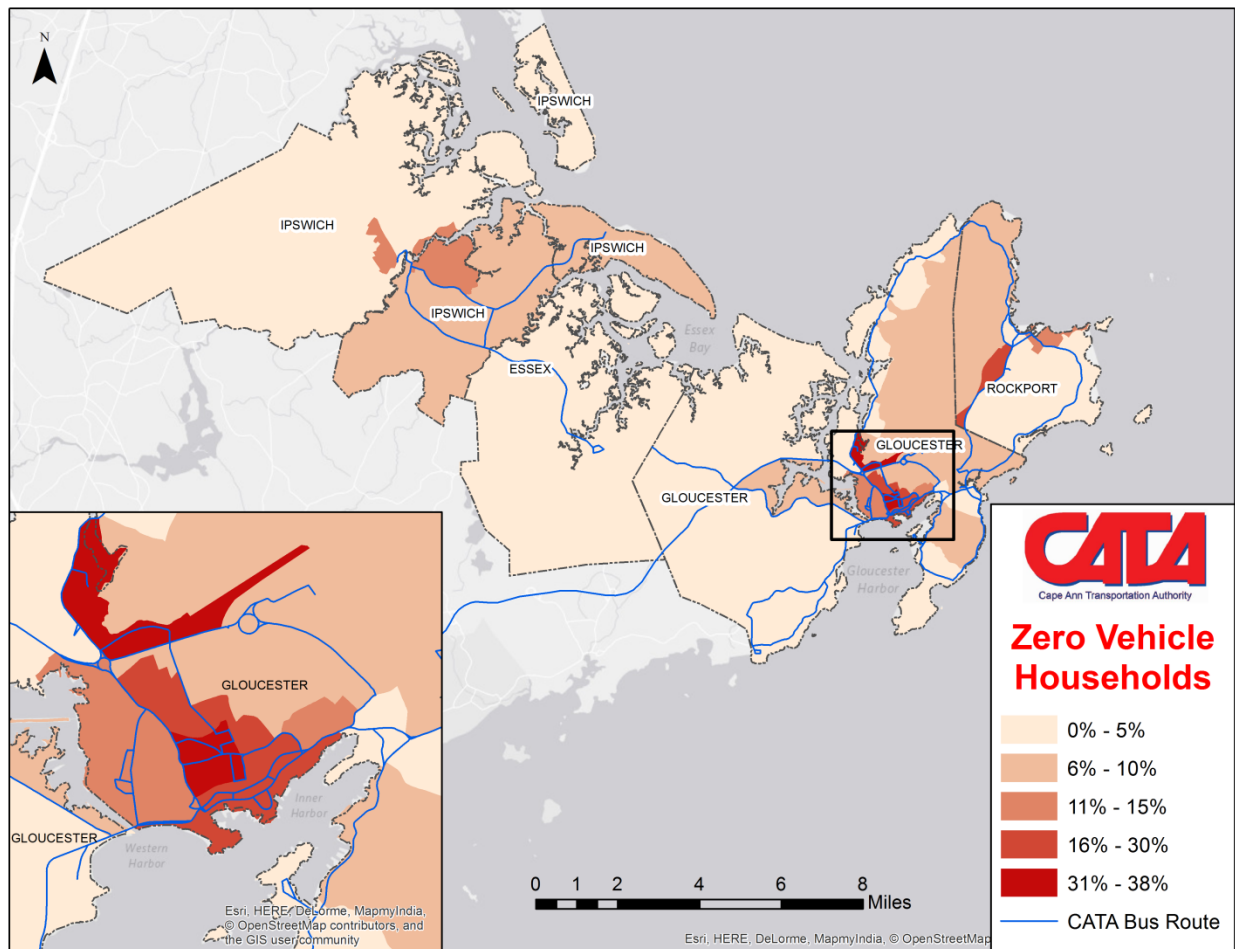


Figure 31. Zero-Vehicle Household

4.22 Methodology

To determine if CATA’s service is deployed in the most effective way possible to accommodate the transit needs of the region’s workforce, the level of potential demand was calculated. The level of potential demand is based on the following: population density, number of jobs, percent of zero-vehicle households, proximity to schools and hospitals, median household income, the enrollment at local colleges and universities, park and ride lots, commuter rail stations, the percent of households with people with disabilities, and the percent of the population above the age of 65⁵. The data was derived from the 2008-2012 American Community Survey (ACS) 5-Year Estimate and the MassGIS website (Table 9). The level of demand was analyzed at the census block level.

⁵ Priority development area data was not included because there are no officially designated PDAs in this region.

Table 9. Transit Demand Data Variables and Sources

Variable	Source
Population	ACS 5 Year table 2008-2012 SF 3 Table B00001
Area	Cartographic boundary files US census
Zero-Vehicle household	ACS 5 Year table 2008-2012 SF 3 Table B25044
Schools	MassGIS from Mass - DOE
Hospitals	MassGIS from the DPH - OEMS
Median Household Income	ACS 5 Year table 2008-2012 SF 3 Table B19013
Colleges and Universities	MassGIS from National Center for Education Statistics
Disabled Households	ACS 5 Year table 2008-2012 SF 3 Table B22010
Employment	MAPC statewide employment data
Park and Ride Lots	MassDOT
Commuter Rail	MassGIS from CTPS
Elderly Populations	ACS 5 Year table 2008-2012 SF 3 Table B00001

To compile the data, all GIS shape file layers and tables were loaded into ArcGIS and joined on the appropriate variables. Data was then transformed to the census block level if it did not exist in this form already and then clipped to the RTA service area. A model was then run in ArcGIS to calculate the population density, percent of zero-vehicle households, percent of households with people with disabilities, percent of the population older than 65, and employment density within each block. This data along with the median household income, school, hospitals, park and ride lots, commuter rail, and colleges and universities was then extracted into Excel for each block within the service area of the CATA.

Using the Jenks natural breaks optimization method⁶, the data for the population density, number of jobs, percent of zero-vehicle households, percent of households with people with disabilities, percent of the population older than 65 and median household income were arranged into five classes. Clipping the data during the first step allows for the evaluation of only the RTA service area, so the values for the class breaks differ among the RTAs. This is important as it minimizes the data being skewed by areas not serviced by the RTA and allows for a more accurate picture of whether the RTA's service is deployed in the most effective way possible for that region.

Population density, number of jobs, percent of the population older than 65, percent of zero-vehicle households, and percent of disabled households all have a positive correlation with transit demand, and thus higher values were placed into higher classes. Those that fell into class 1 were given a score of 1, class 2 received a score of 2, etc. up to class five. Income has a negative correlation with ridership, so those that fell into class 1 were given a score of 5, class 2 a score of 4, class 3 a score of 3, class 4 a score

⁶ The Jenks method is a way of arranging data into different classes by minimizing the average deviation from the mean and maximizing each class's deviation from the means of other groups. It is based on standard deviation.

of 2, and class 5 a score of 1. The scores were then weighted based on highly recognized research done by Brian D. Taylor on the determinants of transit ridership⁷. The study uses a two stage regression model to look at more than fifteen census variables in 265 urbanized areas to determine which characteristics impact the level of transit use the most. The parameter estimates found in the study were used to weight the classification value given in the previous step for population density, percent of zero-vehicle households, and median household income. These weights represent the relative impact each variable has on transit demand, with higher weights being assigned to variables that have a higher likelihood of increasing the demand for transit within an area.

Taylor's research showed that the percent of college students has a positive correlation to ridership. A weighted score was calculated by dividing the number of enrolled students according to the National Center for Education Statistics by 1,000. For the commuter rail stations, schools, and hospitals one point was given for each located within the block. Work trips are one of the primary trips taken by individuals so weight of 1.5 was applied to the classification score for the number of jobs located in a block. Park and ride lots were scored by dividing the number of spaces by 100 to provide a weighted score for ridership. Research has also shown that people with disabilities are more likely to use transit than those without as it may be their only mean of motorized transport. A complete set of variables and method for calculating its value can be seen in Table 10.

Table 10. Transit Demand Variables and Formulas

Variable	Value Calculation
Population Density	Classification score * 0.76
Zero-Vehicle Households	Classification score * 1.75
Schools	Number of Locations
Hospitals	Number of Locations
Median Household Income	Classification score * 0.92
Colleges and Universities	Number of Students/1,000
Disabled Households	Classification score * 0.25
Employment	Classification score * 1.5
Park and Ride Lots	Number of spaces/100
Commuter Rail	Number of Locations
Older Populations	Classification score * 1.31

The scores for each variable were then summed for each block to get an overall score for transit demand by block. This data was then put into GIS and displayed to show demand for the entire region. Features such as schools, hospitals, park and ride lots, commuter rail stations, key destinations, and

⁷ Taylor, B.D. et al, Nature and/or nurture? Analyzing the determinants of transit ridership across US urbanized areas, Transport. Res. Part A (2008), doi:10.1016/j.tra.2008.06.007

important features were overlaid on the map to provide a frame of reference and to act as supporting material.

4.23 Transit Demand

Following the methodology outlined above, the analysis of the CATA system shows that overall the system is successfully serving the areas of the region that demonstrate the highest levels of transit demand. CATA provides fixed-routes service to all but four areas with the potential for high transit demand (Figure 32). These areas are located in Gloucester, Essex (two locations), and Ipswich. This section provides a further analysis of these areas and explores why they have demonstrated transit demand.

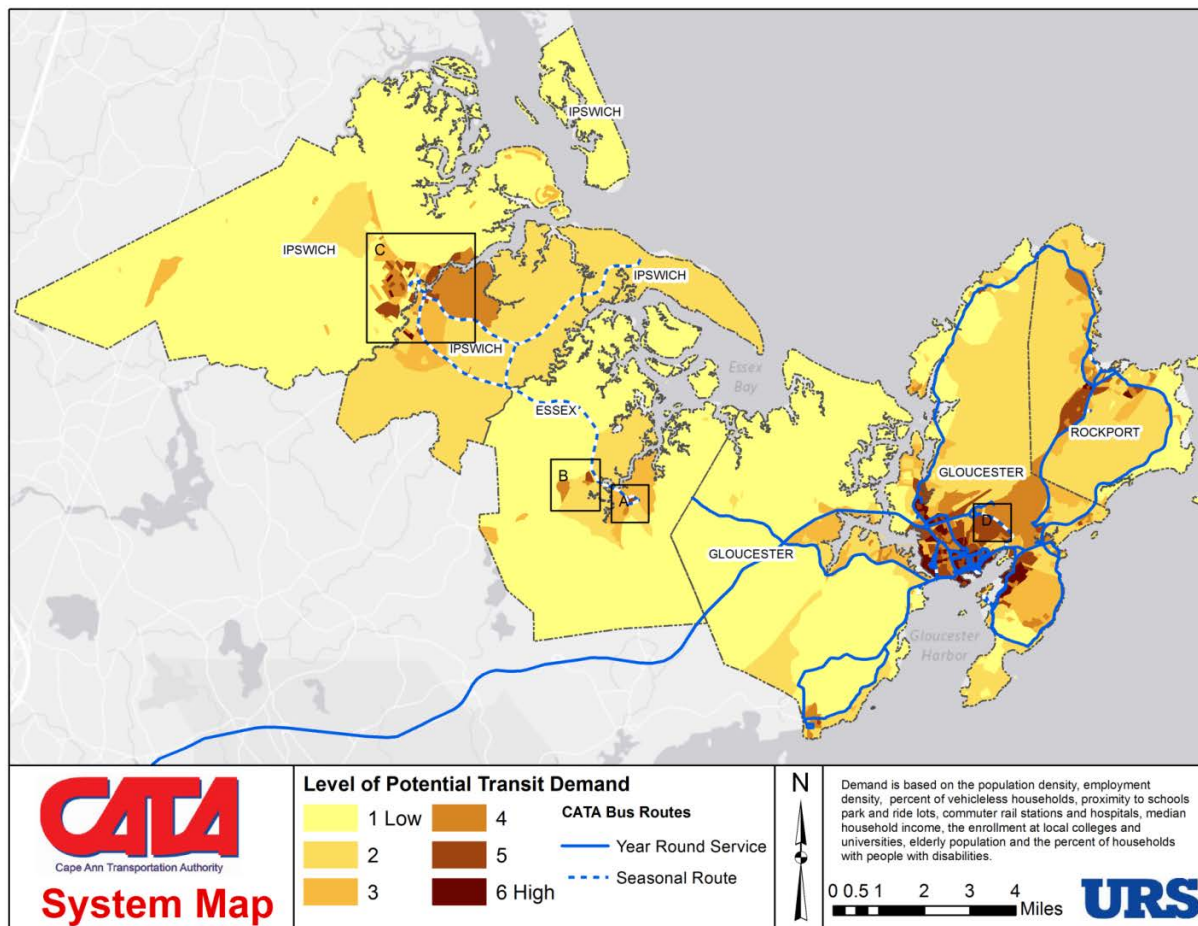


Figure 32. Underserved Areas

Area A (Figure 33) in Essex has a demonstrated demand for transit because of a higher than average population density and a higher than average concentration of individuals over the age of 65. However, this area is home to very few jobs. During the summer, the seasonal Ipswich-Essex-Crane Beach route serves the area. It operates on weekends and holidays, with three daily trips to Essex.

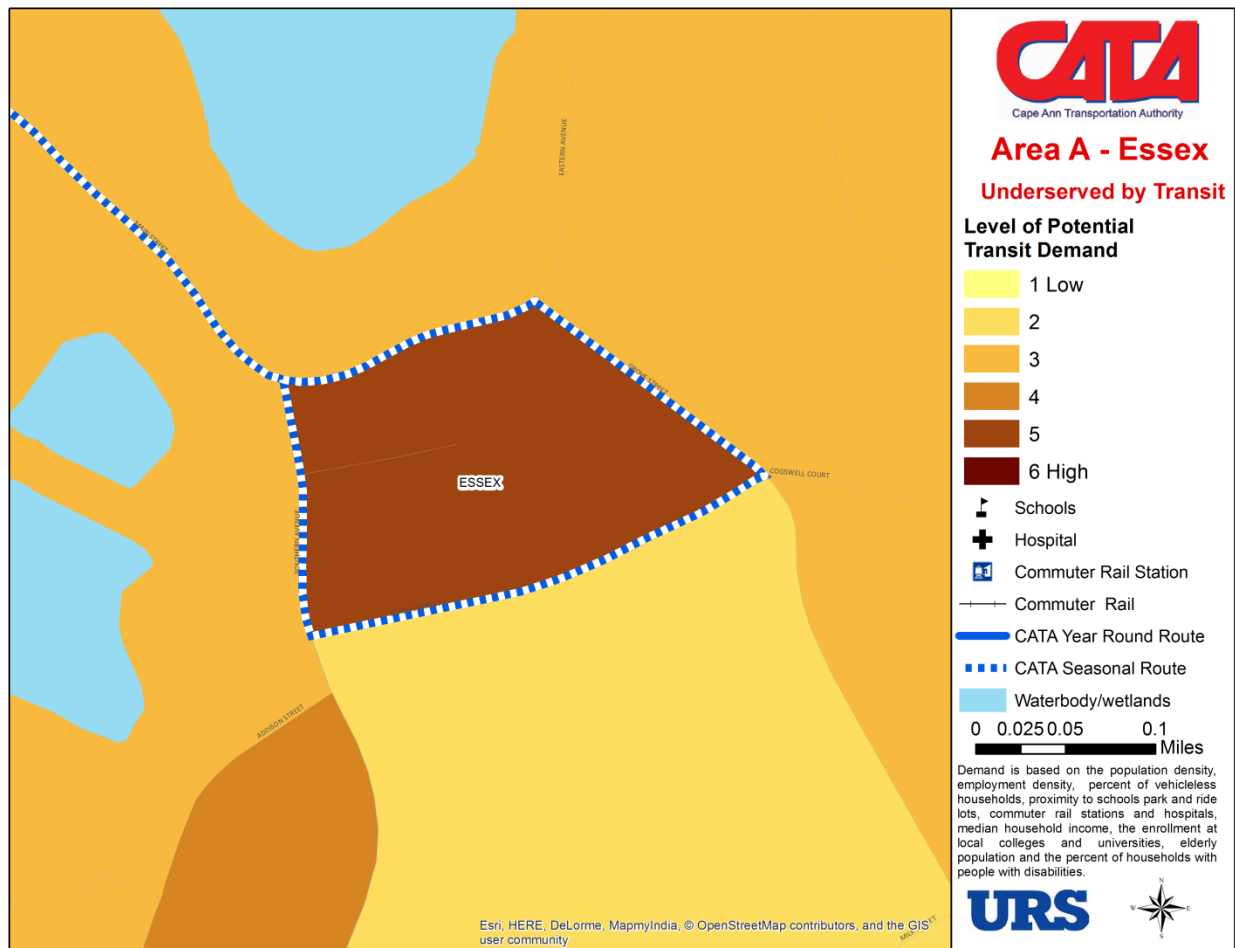


Figure 33. Area A: Essex

Area B (Figure 34) in Essex has a demonstrated demand for transit because of a large (47%) concentration of individuals over the age of 65 and the presence of approximately 200 jobs. During the summer, the seasonal Ipswich-Essex-Crane Beach route serves the area. It operates on weekends and holidays, with three daily trips to Essex.

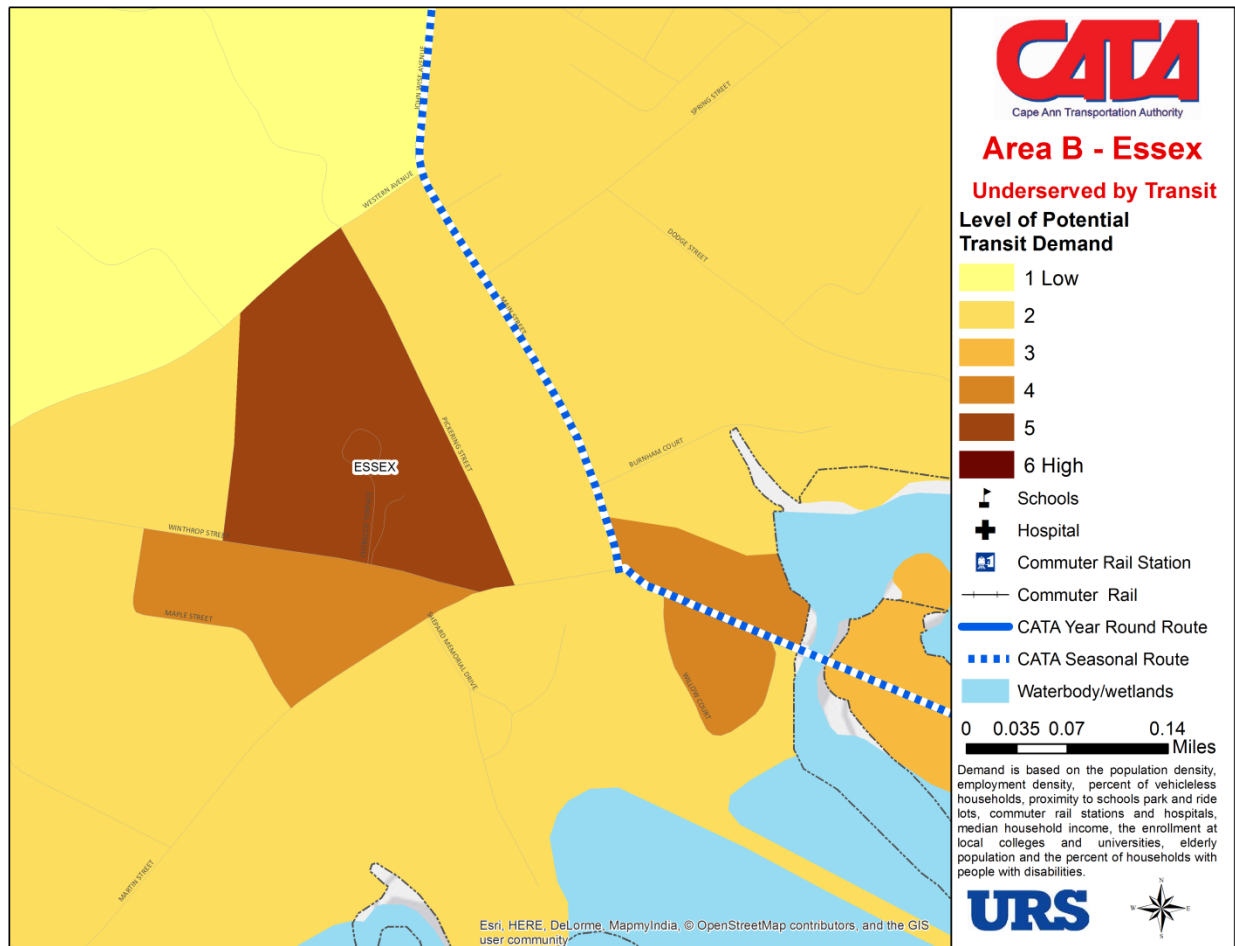


Figure 34. Area B: Essex

Area C (Figure 35) in Ipswich has a demonstrated demand for transit because of its location in Downtown Ipswich. This area has a population density of approximately 5,500 people per square mile as well as more than 2,000 jobs. The Ipswich train station averages 579 trips a day, and the area surrounding the station has a rate of zero-car households of more than 10%. This area also has a lower than average median household income, \$61,000 as compared to the region's average of \$72,000. During the summer, the seasonal Ipswich-Essex-Crane Beach route serves the area on weekends and holidays.

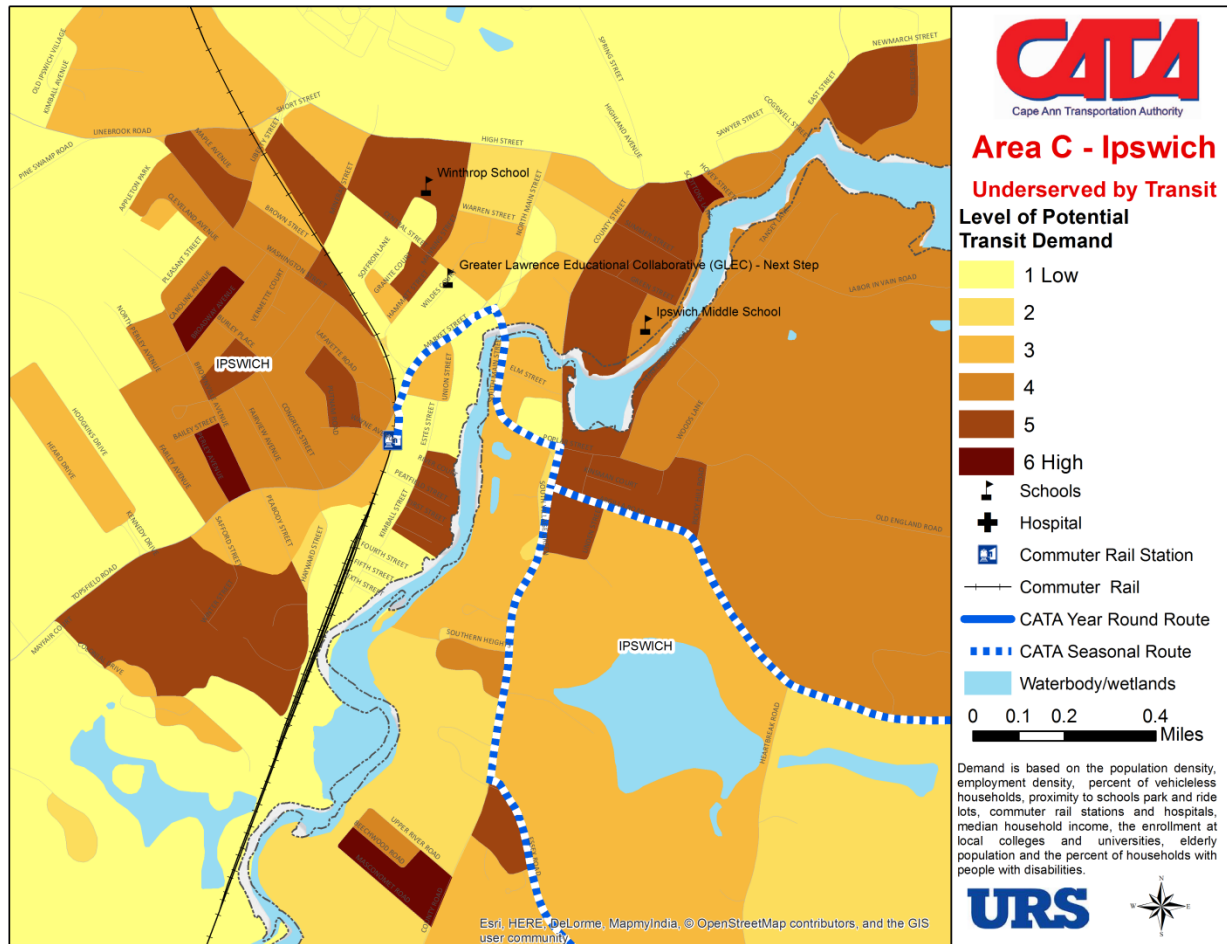


Figure 35. Area C: Ipswich

Area D (Figure 36) in Gloucester has a demonstrated demand for transit because of the concentration of more than 500 jobs, largely associated with the Gloucester Crossing Development Center. This area is served by one daily bus trip to Blackburn Industrial Park from downtown Gloucester.

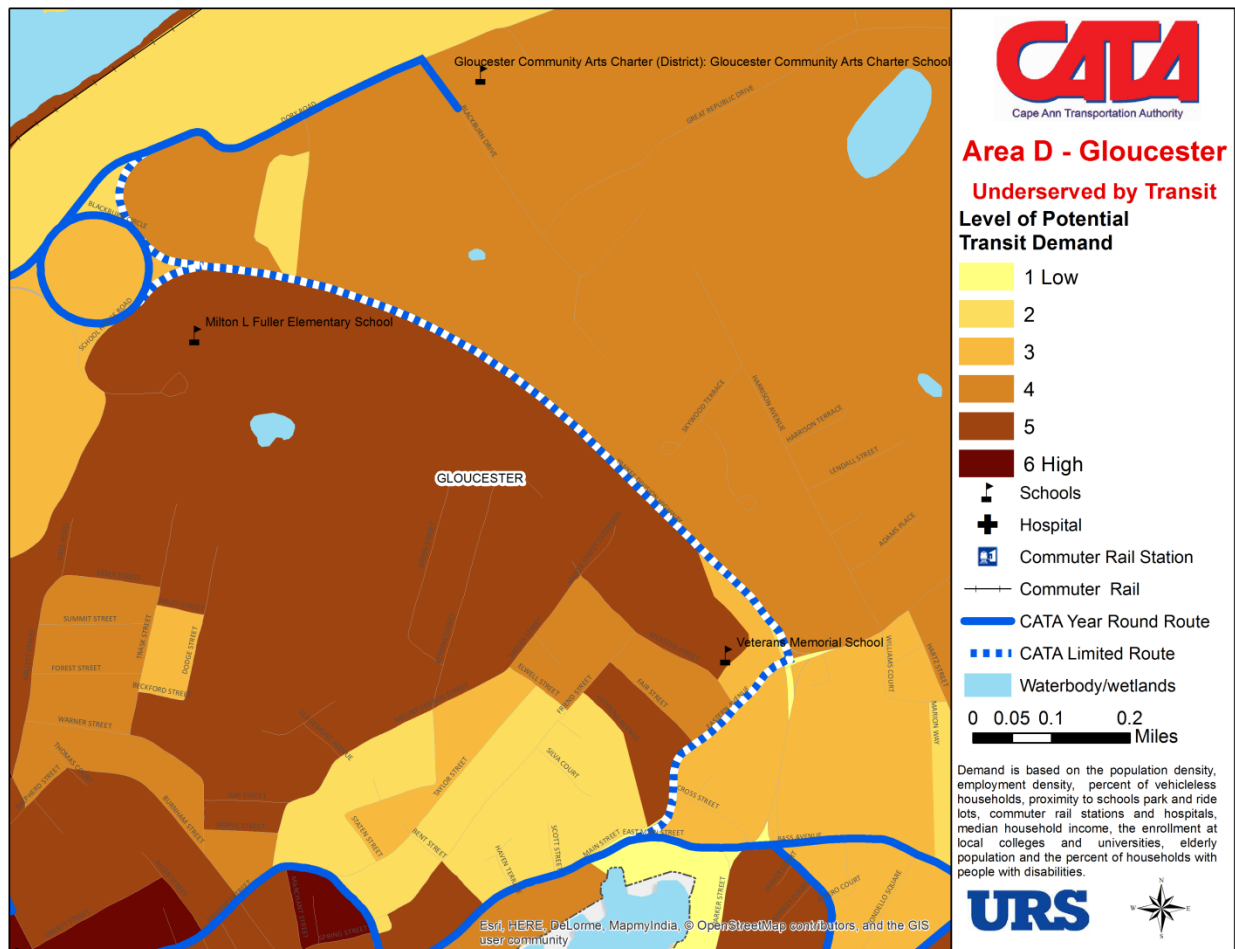
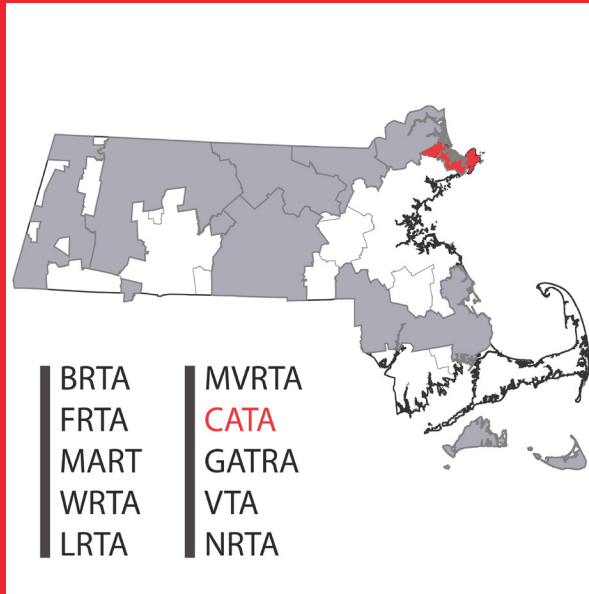


Figure 36. Area D: Gloucester

There are areas in the CATA service area which are possible candidates for service modifications, which would allow CATA to better deploy service to meet the needs of the region's workforce and improve access to employment. Operating late night service⁸ on many of the routes would allow for second and third shift employees to use transit. Providing service outside of traditional days and times would allow for additional trips besides those for work. CATA has demonstrated success at creating an intermodal system by providing connecting services at commuter rail stations to bring riders to their final destination. While this helps to connect people to employment, more can be done. To understand what the system can achieve, we must first understand what the current demand is. The following are profiles and maps of each route, within the CATA service area, depicting the regional demand within ¼ mile of each route. Recommendations in the following chapters will be designed to strengthen job access and develop even better connections.

⁸ Night service is defined as service that runs between 7 PM and 11 PM. Late night service is any service that ends after 11 PM.



Chapter 5

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5. FARE RATES AND COLLECTION METHODS

5.1 Collection Methods

The Cape Ann Transportation Authority (CATA) purchased and installed the Scheidt & Bachmann Fare Collection system which went into service in March, 2012. This new system replaced a model year 2002 GFI electronic Fare Collection system. Fareboxes are installed in all fixed route buses, allowing passengers the ease of either paying cash or using the CharlieCard SmartCard on the bus. Below is a brief description of the farebox technology.

Farebox

Each Farebox includes a Smartcard target. This target allows a passenger the ability to pay for their fare or transfer from one Route to another by simply tapping their CharlieCard card on the target. In addition, the farebox is capable of electronically validating and registering (verifying) all coins and bills inserted for payment. All coins and bills are automatically identified by denomination, without operator action. All invalid coins and bills are automatically rejected and returned to the passenger. The VARE point Farebox assists operators with verification of the fare deposited by showing on the Operator Control Unit (OCU) and on the customer display the value of the coins and bills inserted. All accepted coins and bills will be deposited into a single Cashbox, securely compartmentalized to separate the coins and bills. Partially damaged bills can be processed by the driver on the OCU using the “Accept next bill” command, entering the amount and bypassing the validation process.

5.2 Fare Structure

CATA offers a wide range of fares which can be found in Table 11.

Table 11. Fares

Fares-Adults (13+)	
Adult (in-town)	\$1.00
Adult (out-of-town)	\$1.25
Mall Bus (Danvers & Peabody) round trip	\$5.00
Mall Bus (Danvers & Peabody) one-way	\$3.00
Fares-Senior/Disabled	
Senior/Disabled (in-town)	\$0.50
Senior/Disabled (out-of-town)	\$0.60
Mall Bus (Danvers & Peabody)	\$2.50
Mall Bus (Danvers & Peabody) one-way	\$1.50
Children (5-12)	
Child (in-town)	\$1.00

Child (out-of-town)	\$1.25
Mall Bus (Danvers & Peabody)	\$2.00
Mall Bus (Danvers & Peabody) one-way	\$1.00
Passes	
Student Semester Pass	\$100
Student Annual Pass	\$200
Pass Plus (Annual)	\$25

5.3 National Best Practices

This chapter provides an overview of different fare policies and fare media that are used throughout the United States. While the fare policies and practice of CATA reflect local needs and practices, the comparison with national standards can provide helpful insight and guidance regarding ways to improve available fare media and policies. The fare policy and standards section describes various policies and fare pass types employed by transit agencies and represent standard fare practices on a national level. A wealth of information regarding best practices in fare policy, technology, and fare media is presented by the Transit Cooperative Research Program (TCRP) and forms the basis of this section. Information is also supplemented by research on specific fare practices of transit agencies throughout the country.

An overall summary of TCRP Report 94, the update on Fare Policies, Structures, and Technologies shows that⁹:

- Overall fare levels are increasing, specifically the base cash fares
- Agencies are moving towards a more simplified fare structure
- Many agencies are moving away from a policy of free or reduced cost transfers and replacing the transfer policy with a day pass that can be purchased onboard vehicles
- Pre-paid and multi-trip fare media is growing
- Many agencies have either implemented or are exploring Smart Card technologies
- Regional fare integration, where multiple operators within a metropolitan region, are moving towards a common fare policy and media improving the customer experience

5.31 Fare Technology and Media

Fare technology and media represent the primary hardware and software for collecting passenger fares onboard transit vehicles. Transit agencies throughout the country use a variety of different fare technology and media (how the fare is paid). The technology and media have evolved greatly over the years. Current fare technology runs the range from non-registering fareboxes which are literally just containers that house the fare revenue deposited by passengers all the way up to SmartCard

⁹ Transit Cooperative Research Program Report 94: Fare Policies, Structures, and Technologies pages 2 through 5

technologies that allow passengers to pay their fare with a quick pass of a credit card size fare instrument. Technology is evolving in such a way that some agencies have been experimenting with paying fares using SmartPhone applications. Some systems, primarily rail and Bus Rapid Transit systems, have off-board fare collection technology with a proof of payment system. Below is a description of different fare technology and media.

Non-registering fareboxes are the simplest fare technology. These fareboxes are little more than containers where passengers are able to deposit fares. These fareboxes can only accept cash fares or, if the system utilizes them, fare payment coupons. Flash passes, coupons, and punch cards are used for prepaid fare media. These fareboxes do not have the ability to track ridership payment characteristics. Many operators who use these fareboxes will have a separate passenger counter device that the operator manual “clicks” for each fare type. Very few systems use non-registering fareboxes nowadays.

Registering fareboxes allow for fares to be paid and data to be collected regarding fare types. These fareboxes can collect the number of passengers boarding a bus by each fare type for each trip operated. Registering fareboxes can be designed to accept different types of fare media including flash or punch passes or even magnetically coded fare cards. With magnetically coded fare cards, the fare type can be read automatically by the farebox. For punch and flash passes, operators can manually enter information regarding fare type paid. These are currently the most common types of fareboxes.

The newest fare technology used by transit agencies are known as a SmartCard system. The SmartCard fare instrument is the size of a credit card and can be loaded with any kind of pass or stored value passes. SmartCard readers are needed on fareboxes in order to process fares. Similar to the magnetically coded fare media, many different fare types are available and are automatically counted by the farebox itself. By installing SmartCard readers at each door of a transit vehicle, multiple door boarding can be facilitated. Another advantage of SmartCards is that they can be used by multiple systems. The Massachusetts Bay Transportation Authority (MBTA) Charlie Card, which is also accepted by ten of the fifteen Regional Transit Authorities¹⁰, is an example of a SmartCard. There is a high cost to transit agencies when implementing SmartCards as they require new or modified fareboxes, and the fare media itself is rather expensive.

SmartCard technologies are constantly evolving, such as with contactless technology where a user no longer swipes a farecard but simply taps the card on a reader and enters and mobile ticketing where ones pays their fare from their smartphone. An example of a contactless card is the Washington METRO SmarTrip card. Transit agencies are also starting to experiment with fare payment through cellular

¹⁰ Charlie Card is accepted for fare payment by the following operators: Massachusetts Bay Transportation Authority, Berkshire Regional Transit Authority, Brockton Area Transit Authority, Cape Ann Transportation Authority, Cape Cod Regional Transit Authority, Lowell Regional Transit Authority, Merrimack Valley Regional Transit Authority, MetroWest Regional Transit Authority, Montachusets Regional Transit Authority, Southeastern Regional Transit Authority, and Worcester Regional Transit Authority

telephone. With this, the cellular telephone operates as a SmartCard and has the ability to store multiple pass options and fare types. This works by riders downloading an application onto their cell phone, payment is processed through the app, and a transit pass is produced on the person's phone¹¹. This mobile ticketing system is currently used by TriMet in Portland, OR, the first agency in the US to pilot this for fixed route. The user simply selects their rider and mode type to purchase a ticket. When they want to use the ticket, they select the ticket which generates a QR code that the fare inspector can scan. The technology was developed by GlobeSherpa, a Portland based software company. Similar technology, developed by Bytemark, was deployed in 2014 at Capital Metro in Austin, TX. Locally, the MBTA uses technology developed by Masabi for mobile payments on their commuter rail and ferry systems.

In the future, other technologies such as the Magic Band which Disney uses as admission to the park, connects to your credit card for easy payment, and unlocks your hotel room, may be possible for travel on transit. The band contains a short range RFID chip similar to the read-only RFID¹² chip found in contactless SmartCard technology. The Disney Magic Band is similar to the UBand made by IDenticard. The UBand uses MIFARE¹³ technology to provide contactless access and payment and is currently being used by Mohawk College in Ontario. In the United Kingdom, Barclaycard launched the bPay band, a similar wrist band which users can link any VISA or MasterCard debit or credit card to and can be used at any establishment that accepts contactless payments (300,000 locations). Amongst the many things the band can be used to pay for is the fare (bus or rail) on Transport for London¹⁴.



Figure 37. SmartCard Technologies. Left WMATA Smarttrip contact-less; Center TRI MET mobile ticketing; Right Disney's Magic Band

¹¹ <http://trimet.org/mobiletickets/>

¹² Radio-frequency identification cards (RFID) is a wireless chip which uses electromagnetic fields to transfer data,

¹³ MIFARE is the name of the technology (chip) that is created by NXP. It complies with international standard ISO/IEC 14443 for data security and transmission protocols for communication with contactless integrated circuit cards, proximity cards and identification cards.

¹⁴ The agency who oversees the London rail and bus network.

Fare media has evolved drastically over the last 100 years for transit from entirely cash based system to the new innovative contact technology emerging today. The first fare media was the token followed by the ticket. These allowed transit agencies to offer discounts over the cash fare. Tickets were used until magnetic stripe cards were introduced, this allowed for the development of passes. Tap cards were developed next with RFID technology and had the capability of operating as a stored value card and as a daily, weekly monthly, etc pass. The newest technology is contactless “open” fare payments which are directly linked to debit or credit cards and can be in plastic card form, on a mobile device and now a wrist band. Regardless of the type of technology used reducing cash transfers benefits the transit system all around. The overhead cost to process cash as opposed to cards can be as much as double due to the security measures and personal needs to empty vaults and count money. Improved farebox technologies not only can improve operating costs but can speed up the boarding time of passengers thus reducing the overall travel time.

In Helsinki, an innovative fare strategy is being implemented through a new market approach viewing Mobility as a Service (MaaS). The principle of the MaaS approach focuses on door-to-door service and mobility as a whole package, instead of each mode individually. Through this method, users are able to plan their trip through one portal and payment system. Different packages provide riders with unique options to meet their transit needs. For example, an urban commuter package, available for purchase at a set price point, may include free public transport in the rider’s home city, up to 60 miles in taxi services, 300 miles for rental cars, and 1,000 miles in domestic public transport. Packages are flexible and can be adjusted to meet the needs of different service areas. Incorporating all transport modes into one, user-friendly interface will provide seamless service to the rider and encourage the use of public transportation over personal vehicles.

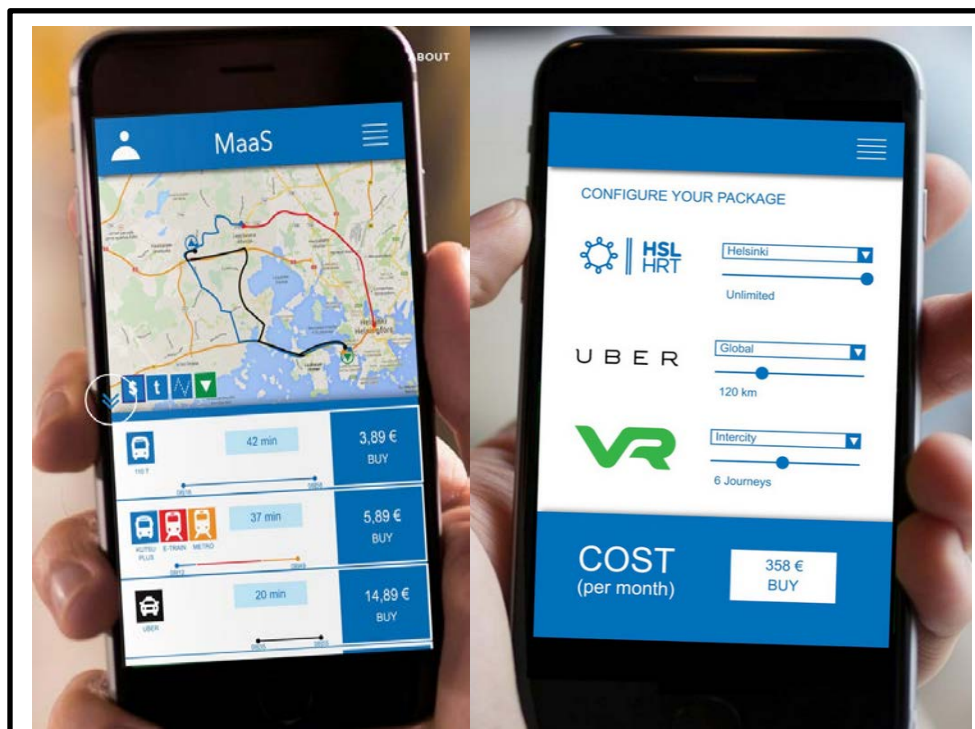


Figure 38. Helsinki Mobility as a Service App

Some systems have implemented off-board fare collection/proof of payment fare payment. Off board fare collection requires fare equipment located at stops and stations and allows for faster boardings. Passengers pay their fare off-board and are issued a receipt or their farecard is validated for the trip. Fare inspectors randomly check to see if passengers have paid their fares by scanning farecards or looking at the receipts. Those who have not paid fares are issued a citation.

5.32 Fare Policy and Standard Practices

A review of fare policies around the country provides a myriad of different fare types and fare media. Fare media types include unlimited ride passes and multi-ride/stored value transit fares. A description of cash fares and transfer policies are included in this section. Fare policies and standard practices vary amongst various transit agencies and are suited to meet individual local conditions.

Fare Policies

Cash fares are accepted by almost all transit agencies. Most transit agencies accept only exact fare and will not make change. A small number of agencies will make change for passengers on some or all services. Some agencies have limitation with their fare collection equipment that only allows the farebox to accept coins, while most operators are able to accept both bills and coins.

Unlimited ride passes allow users to take as many rides as needed over a set period of time. These passes are a pre-paid fare media and come in many increments. Most agencies have either a 30-day, 31-day or “monthly” pass. For a shorter duration, agencies may have a week pass or even a two-week

pass. The shortest duration pass is a one-day pass and agencies that sell a one-day typically do not have free or discounted transfers. Unlimited ride passes provide a discount over cash fares, with the discount related to the number of times the pass is used as it represents a single payment over a time period. The issue with unlimited ride passes is that it typically requires a large upfront payment by customers to take advantage of the discount, which may be difficult for lower income users.

Multi-ride passes or stored value cards allow for passengers to buy a set number of transit trips ahead of time usually at a discount. These pass/stored value cards allow for the pre-paid purchase of discounted fares. Similar to the unlimited ride passes; these fares require a large upfront payment, although not as large as the unlimited ride passes, in order to take advantage of discounts. Multi-ride passes/Stored value cards can come in a variety of different types of media and formats including ticket books, tokens, punch cards, or as stored values on a fare card or SmartCard.

Some agencies have instituted free fares. Free fares primarily exist in places where the primary generator in the area is a major university. In these areas, funding sources for transit services come from the university. In other locations, college students are provided a free transit pass that is funded by student service fees, parking revenues at the college, general fund revenue, or a combination of these sources. An example of a system that has a free fare policy is Chapel Hill Transit in North Carolina, which serves the University of North Carolina¹⁵.

Transfer policies are a very important consideration and part of any fare policy and fare media. Transit passengers have varied origin and destination locations so it is impossible to serve all passengers without requiring passengers to transfer. Many systems are designed around bringing passengers to a central location where they can connect to another bus to reach their destination. Other systems have transfers occur at points where two or more routes intersect. Regardless of transfer location, transfer policies have an impact on ridership. The existing transfer policies include allowing transfers to occur for free, transfers to occur at a low cost, or requiring passengers to pay full fare when transferring. Some systems have different policies based on fare media used, for example a free transfer if using a SmartCard while cash passengers have to pay full fare when transferring.

Standard Practices

Fare policies typically respond to local needs. In some locales the fare policy and changes to fare policies are well codified. In other locations, fare policies change only in response to an identified issue; otherwise fare policies may not change at all for a long time. Fare policies need to be responsive to local needs. The fare policy has to be cognizant of the need to provide an adequate local share of operating costs. That being said the fare policy has to also strike a balance between being equitable to all users, encourage pre-paid fares, encourage ridership, and the need to raise local revenue.

¹⁵ <http://www.townofchapelhill.org/town-hall/departments-services/business-management/fee-schedules/transit-policies-fee-schedules>

Federal rules and guidelines need to be taken into account in fare policy discussions. Environmental justice concerns also need to be taken into account as part of fare policy and fare policy changes as it relates to Title VI of the Civil Rights Act of 1964. Legal proceedings have forced modifications to fare policies and fare policy changes due to environmental justice concerns¹⁶. Environmental justice concerns are addressed by ensuring that fare policy changes are equitable for all services an agency operates. Fare policies also need to be consistent with rules and guidelines with the American's with Disabilities Act.

As stated previously, very few agencies have a policy regarding fare changes. Primarily, agencies adjust fare levels based on a specific need, usually the need for additional directly generated revenue. This could be in response to cuts in funding from other sources, changes in cost structure, or overall cost increases. On a philosophical level many agencies prefer to increase fares along with improvements in service so that passengers are receiving “better service” as part of higher fares.

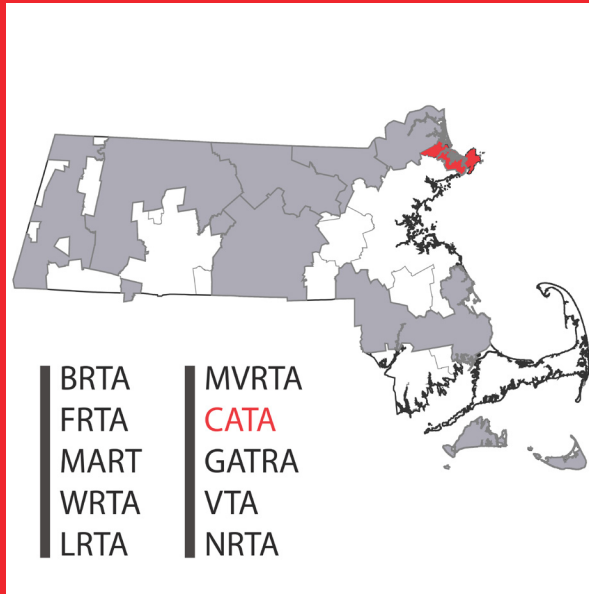
The key elements of a fare policy include a base cash fare, multi-ride fare media, unlimited ride passes, and a transfer policy. Ten out of fifteen RTA's in Massachusetts use the Charlie Card SmartCard for fare payment which does have the ability to store unlimited ride passes. Beyond this fare policy, transit agencies have been partnering with colleges and universities to fund UPass programs which provide free trips for students and guaranteed revenues for the transit agency.

6.4 Conclusion

Moving forward, the best plan of action involves each of the RTAs joining together to research and develop innovative fare policies and media for the next generation. Through collaboration, the RTAs have the chance to implement fare strategies that can function collectively across Massachusetts and be a model for innovation. As the Sheidt & Bachmann fareboxes and CharlieCard technology that many of the RTAs have becomes outdated and must be replaced, it will present an opportunity for the RTAs to explore alternative technology such as the MaaS project in Helsinki, mobile payments, or the bPay/Magic Band/Uband. A system-wide approach, as opposed to individual fare strategies for each RTA, will foster a cohesive transit system and provide riders an easier opportunity to travel between the RTAs.

¹⁶ Transit Cooperative Research Program Report 94: Fare Policies, Structures, and Technologies page 5

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Chapter 6

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6. ENVIRONMENTAL

In 2010, MassDOT launched their sustainability and environmental responsibility initiative to “green” the state transportation system, called GreenDOT. All branches of the Commonwealth’s transportation system (transit, air, highway and planning) are subject to the policies contained within the GreenDOT initiative. The policy is driven by three primary objectives: (1) reduce greenhouse gas emissions, (2) promote healthy transportation options, and (3) support smart growth and development. In order to meet these objectives and to become a national leader in sustainability and transportation, MassDOT created an implementation plan in 2012 that outlines 7 themes (Air, Energy, Land, Materials, Planning Policy & Design, Waste, Water) and 16 sustainability goals. As part of the GreenDOT policy, each indicator was given a priority for implementation. Indicators for immediate implementation are those that were to be implemented by 2013, medium-term by 2015 and long-range policy targets for 2020.

While the concept of improving sustainability and environmental responsibility would prove beneficial for Massachusetts, coordination and input from the 15 RTAs across the state has not yet occurred. In addition, while the GreenDOT policy outlines 331 indicators applicable to the rail and transit division, not all of these are relevant to the fifteen RTAs across the state¹⁷. Those that are not relevant are often the responsibility of the MBTA, Bay State Roads, metropolitan planning organizations, and/or MassDOT but not the RTA. Many of the policies extend beyond the responsibility and reach of any of the RTAs and the timeline for achieving the indicators are not realistic or necessarily right sized for the RTA’s. Many of the RTA’s (either individually or collectively) will require more time to implement these environmental initiatives. A logical step is for each RTA to coordinate and confirm with MassDOT which initiatives are the most appropriate and achievable actions that can be taken and how best to achieve them.

In addition to GreenDOT, Massachusetts recently passed regulation *310 CMR 60.05: Global Warming Solutions Act Requirements for the Transportation Sector and the Massachusetts Department of Transportation*. The purpose of the act is to assist the state in achieving their goals of reduced greenhouse gas emissions (GHG). There are various parts to the regulation that require interagency coordination between MassDOT, Metropolitan Planning Organizations (MPOs), Regional Transit Authoritys (RTAs), the Department of Environmental Protection and the Executive Office of Energy and Environmental Affairs. The RTAs are specifically given 4 tasks:

- Conduct comprehensive service reviews (CSRs),
- Identify service enhancements to increase passenger ridership
- Identify vehicle technology and operational improvements that can reduce GHG emissions
- Work within the MPO process to prioritize and fund GHG reduction projects and investments

¹⁷ Mass GreenDOT policy <http://www.massdot.state.ma.us/GreenDOT.aspx>

The RTAs along with MassDOT and the MPOs will be required to calculate GHG impacts on all RTP projects, consider GHG impacts when prioritizing and selecting projects, and report GHG impacts of all projects. Spreadsheet calculation tools have been developed for calculating GHG emissions and air quality analysis on bus replacements, new bus services, complete street programs and park and ride lots. The Department of Environmental Protection requires that the GHG impacts be measured for all projects and reported annually.

This section of the CATA plan examines how the policy's themes and their goals are being applied to regional transit authorities and which ones, in particular the CATA, is currently meeting. There are a total of 331 indicators identified in the GreenDOT policy, of which only 183 or 55% are applicable to the CATA. Of the 183 applicable indicators, 89 are short term indicators which are recommended to be in place by 2013, 72 are medium term indicators to be implemented by 2015 and the remaining 21 indicators should be implemented by 2020. CATA has met 48 (54%) of the short term, has met or is working towards meeting 41 (56%) of the medium-term and 11 (52%) of the long-range indicators (Figure 39). Overall, the CATA is meeting 85 (46%) of the 183 applicable indicators (Figure 40), even though 11% are not required to be met until the end of 2020 according to GreenDOT.

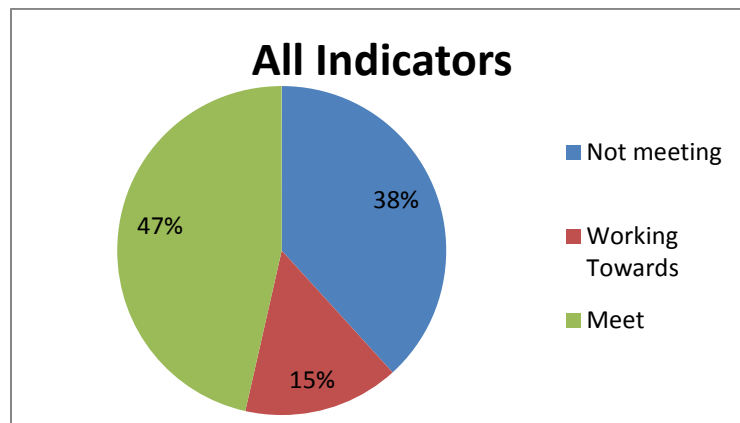


Figure 39. All indicators Level of Attainment

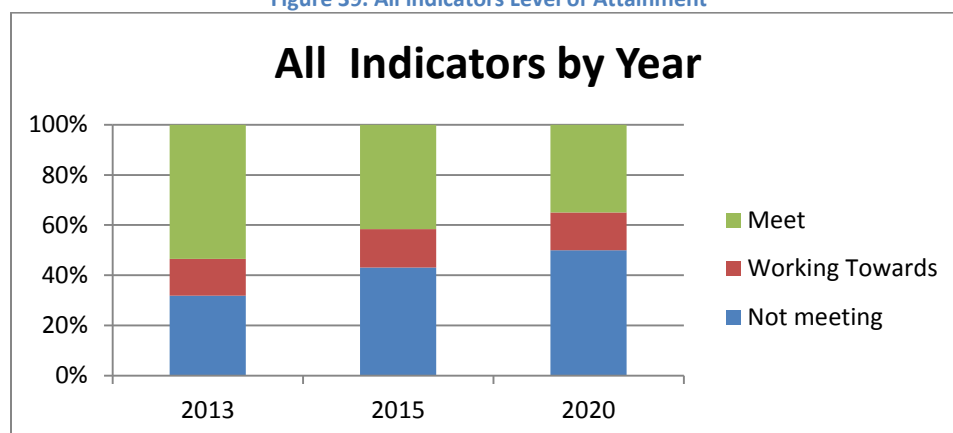


Figure 40. All Indicators Attainment by Year

The CATA is working continuously to achieve the indicators and has accomplished many of them ahead of schedule. Some of the applicable indicators are joint responsibilities of the CATA, MassDOT, the planning commission or the municipality and they must work collaboratively to achieve success. Additionally, of the 183 indicators that do not apply, some reasons may be because they are specific to the MBTA, specific to rail, require that there has been or will be new construction, they are for MassDOT owned facilities, they are for environmentally sensitive land areas, and/or there may be other constraints beyond the CATAs control.

6.1 GreenDOT Policy

The seven themes of GreenDOT that aim to reduce carbon footprints and improve sustainability include air, energy, land, materials, planning (policy and design), waste and water. Each theme has at least two goals and several objectives and indicators for meeting the goal. The indicators are measurable tasks that describe sustainable practices. Table 12 outlines the goals, objectives and indicators for each theme. For each indicator, CATA was asked if they currently are achieving it, are working towards achieving the indicator, do not meet the indicator and are not currently working towards, or if it is not applicable to them.

Table 12. GreenDOT Goals, Objectives and Indicators

Theme	Goals	Objectives	Indicators	Applicable Indicators
Air	2	11	49	34
Energy	2	7	39	21
Land	2	9	45	19
Materials	3	14	63	35
Planning, Policy & Design	3	12	56	34
Waste	2	9	33	24
Water	2	9	46	16
Total	16	71	331	183

6.21 Air

Air goals include improving the state's air quality and reducing greenhouse emissions. To improve statewide air quality, CATA complies with strict idling policies that require vehicles be turned off after five minutes. In addition, CATA and the City of Gloucester are working together to install four electric car charging stations at CATA Administration and Operations building, which includes the City Hall Annex. Some of the other air quality indicators are not applicable because CATA does not operate commuter rail or rail stations.

There are 49 indicators for air but only 34 (69%) are applicable to CATA. CATA is meeting 10 (29%), working towards 2 (6%) and not meeting 22 (65%) of the applicable air indicators as seen in Figure 41. Figure 42 outlines the air indicators by implementation time and level of achievement. There are 15

indicators in the air theme which are not applicable to CATA. For the applicable indicators 15 are short term indicators, 13 are medium-term, and 6 long-range. Of those that are applicable to CATA they have met 5 (33%) of the immediate implementation (2013) indicators, and are working towards or meeting 4 (31%) of the medium-term (2015) indicators and 3 (50%) of the long-range indicators.

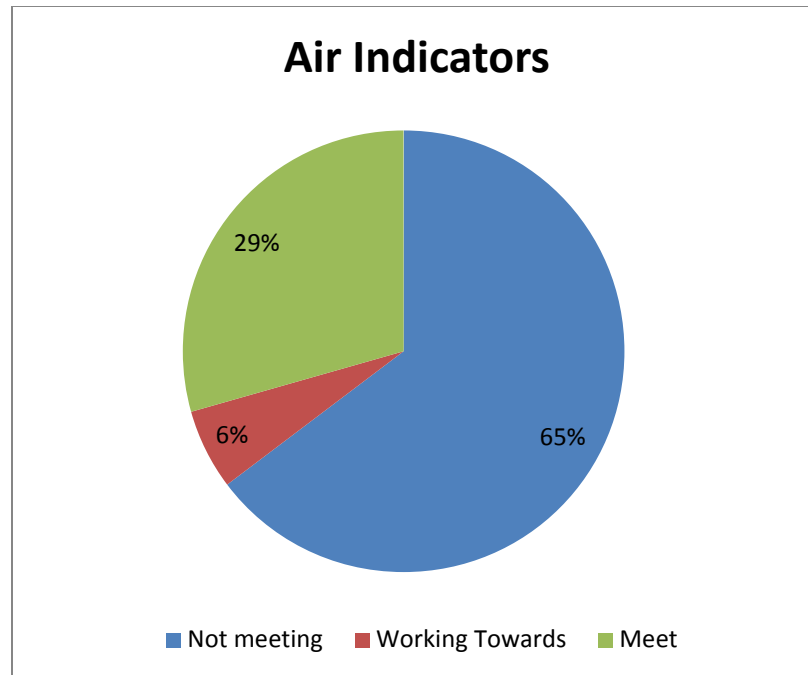


Figure 41. Air Indicators Level of Attainment

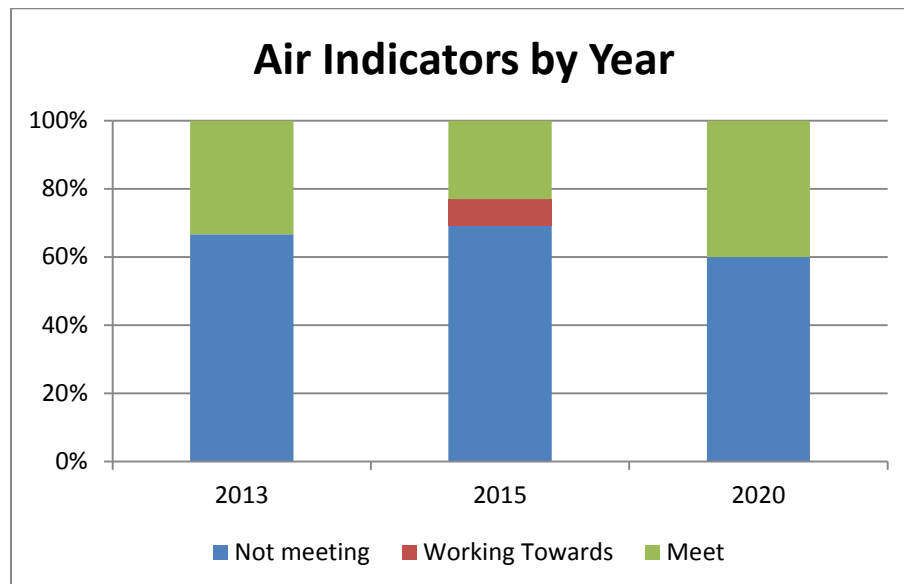


Figure 42. Air Indicators Attainment by Year

Table 13. Air Goal Achievement

Goal 1: Improve Statewide Air Quality	
Objective: Reduce emissions from maintenance & construction equipment	
Indicator	Contribution
Retrofit + use of hybrid engine system for each vehicle class piloted	No
Diesel retrofit program for on and off-road vehicles expanded	No
Hours of non-revenue vehicle operation reduced by 5% through operations streamlining	Yes
Electric and/or full exhaust cycle motors have replaced 2-stroke equipment	No
All new heavy equipment purchased run hybrid, CNG, or other high efficiency engines	No
Objective: Decrease total engine idling	
Indicator	Contribution
On-board electrification of maintenance equipment for each vehicle type piloted	No
MassDOT compliance with anti-idling laws ensured	Yes
On + off-road anti-idling policies included in all construction, maintenance + service contracts	Yes
Anti-idling policies, more restrictive than state law developed to eliminate unnecessary idling	No
Anti-idling technology in transit vehicle + maintenance truck operations utilized	No
90% of MassDOT over-road maintenance vehicles run hybrid engines or have on-board electrification	Not Applicable - no MassDOT vehicles
Objective: Decrease volatile organic compound discharge from facilities	
Indicator	Contribution
Spray painting restricted to permitted booths + emissions controls installed at spray shops	Not Applicable - we don't spray paint
All maintenance yard gasoline fueling pumps retrofitted with vapor recovery systems	Yes
Technologies for diesel + jet fuel vapor recovery explored + implemented where feasible	Yes
Air emission control training provided to all maintenance employees	Yes
Objective: Increase fuel efficiency of operating transit fleet	
Indicator	Contribution
100% of transit bus fleet replaced or retrofitted with hybrid systems or best in class fuel efficiency vehicles	No
Statewide diesel transit + school bus retrofit program optimized + balanced with efficient vehicle purchases	No
20 new high efficiency commuter rail diesel locomotive in service	Not Applicable - Do not operate Commuter rail
40 new high efficiency commuter rail locomotives purchased	Not Applicable - Do not operate Commuter rail

Objective: Increase efficiency of transportation systems operations	
Indicator	Contribution
Bus route efficiency measures implemented by all transit operators	Working towards
Planned bridges and ROWs designed to increase options for double tracked lines + allow double-stack cars	Not Applicable - Do not operate rail
Six rail corridors upgraded to increase speed including separated grade crossings or other improvements	Not Applicable - Do not operate rail
Dwell time of commuter rail trains at stations decreased	Not Applicable - Do not operate Commuter rail
Program initiated to increase the number of high level commuter rail platforms	Not Applicable - Do not operate Commuter rail
Electronic tolling facility of road and parking facilities launched	Not Applicable - we don't operate a tolled parking facility

Goal 2: Reduce Greenhouse Gas Emissions

Objective: Increase vehicle electrification facilities	
Indicator	Contribution
At least 30 electric vehicle (EV) chargers installed along state highway system + transit parking areas	Yes - currently for employee use only; the City is installing 4 charging stations this spring
All major park and ride, + transit parking lots (>50 vehicles) have charging stations	No
Feasibility analysis of expanding the use of battery + fuel cell powered buses completed	No
Optimal Statewide EV plug-in station network planned + implemented	Not Applicable - State Initiative
The feasibility of electric commuter rail locomotives studied within the Commuter Rail Master Plan	Not Applicable - Do not operate Commuter rail
Objective: Increase use of alternative + renewable fuels	
Indicator	Contribution
Bio-fuel (such as B10-B20 biodiesel) tested in oil heated buildings	No
20% biodiesel (B20) blend purchased for oil heated buildings	No
Recycled vegetable oil / non-food stock impairing fuel purchased for biodiesel blends	No
Volume purchasing of alternative fuels established across facilities + divisions	No
B10 + B20 biodiesel pilot begun in all diesel vehicle types	No
B10 to B20 biodiesel utilized in all diesel vehicles, depending on availability, vehicle type + season	No
Objective: Increase fuel efficiency of light duty vehicles	
Indicator	Contribution
Vehicle fleet inventoried + prioritized for replacement and retrofit based on emissions reduction	Yes
A portion of light duty fleet in urban areas integrated with car-share programs	No
Light duty fleet downsized with carpooling, interdepartmental vehicle use, + car-sharing	Not Applicable - the light vehicles we have are support vehicles
All light duty vehicles replaced or retrofitted with hybrid, electric, CNG or best in class technology	No
50% of DOT light vehicle fleet replaced or retrofitted with zero or partially zero emission vehicles	Not Applicable - no DOT vehicles

Objective: Increase fuel efficiency of maintenance + construction equipment	
Indicator	Contribution
Performance measures added to maintenance + construction contracts for green fleets	No
15% of maintenance fleet replaced with best in class emission ratings	No
Objective: Increase telecommuting + meetings by web conference	
Indicator	Contribution
Teleconference technology capabilities installed at all offices	Yes
Take home vehicle fleet for office employees eliminated	Not Applicable - we normally don't have take home vehicles
Telecommuting + flex time options expanded for employees	No
Peak hour single occupancy vehicle trips by employees reduced by 20%	Not Applicable - our employees drive to work and then home; meetings are normally held at our offices. If there is an off-site meeting, we carpool about 75% of the time
Objective: Track progress toward statewide GHG reduction + other sustainability goals	
Indicator	Contribution
All resource use + purchases reported for performance monitoring	Yes - in-house reporting
MassDOT's GHG emissions target of 40% reduction from a 2002 baseline is met	Working towards - through vehicle replacement

6.22 Energy

Energy goals are focused on consuming less energy and increasing the percentage of energy which comes from renewable sources. To improve energy efficiency, CATA has worked to reduce electricity consumed by both the building and outdoor lighting. CATA has retrofitted lighting with energy efficient blubs and adjusted the temperatures of the boilers for heating and water use. In addition, CATA installed a solar panel system on an unused area of its property (Figure 43) to increase the usage of renewable energy sources. Most of the indicators CATA is meeting are included in Goal 1, Consume Less Energy. Several of the indicators are not applicable to CATA because they apply to MassDOT buildings or subway systems.



Figure 43. Solar Panel Array

There are 39 indicators for energy but only 21 (54%) are applicable to CATA. CATA is meeting 13 (62%), working towards 2 (10%) and not meeting 6 (29%) of the applicable energy indicators as seen in Figure 44. Figure 45 outlines the energy indicators by implementation time and level of achievement. There are 18 indicators in the energy theme which are not applicable to CATA. For the applicable indicators 8 are short term indicators, 8 are medium-term, and 5 long-range. Of those that are applicable to CATA they have met 3 (38%) of the immediate implementation (2013) indicators, and are working towards or meeting 6 (75%) of the medium-term (2015) indicators and 5 (100%) of the long-range indicators.

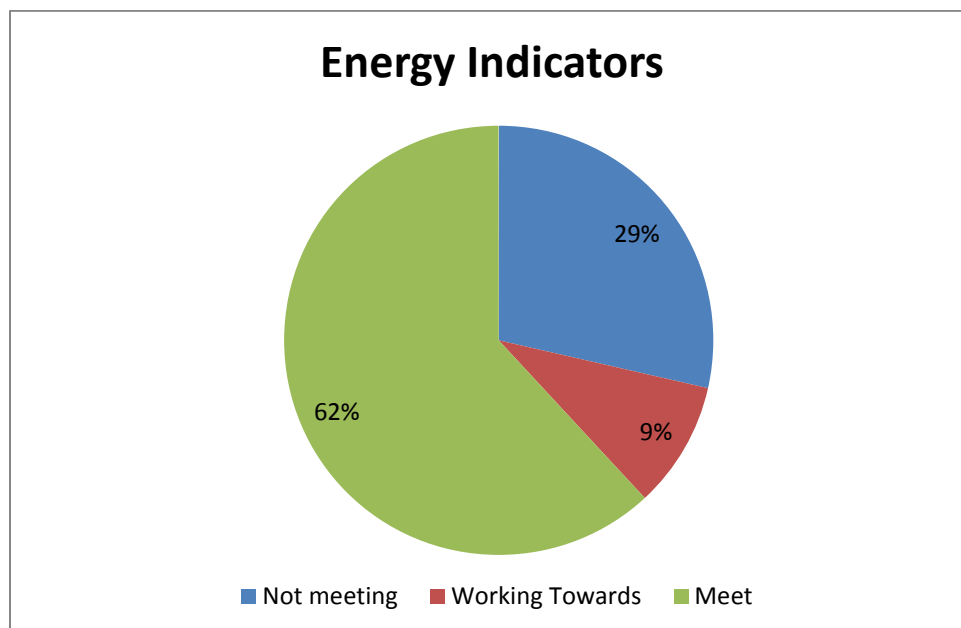


Figure 44. Energy Indicators Level of Attainment

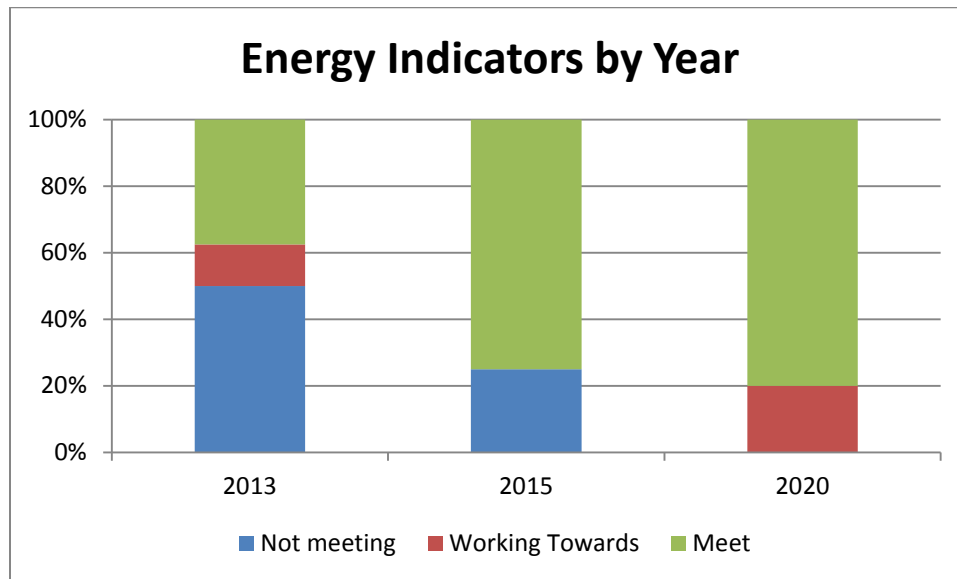


Figure 45. Energy Indicators Attainment by Year

Table 14. Energy Goal Achievement

Goal 1: Consume Less Energy	
Objective: Reduce building electricity use	
Indicator	Contribution
Electrical + HVAC use of all buildings + facilities audited	Yes
Office electrical equipment shutdown program implemented	No
Employee education and incentive programs established to encourage energy use reduction	Working towards - education programs
All buildings not updated in 10 years renovated / overhauled / consolidated	No - we only have one building
Motion sensor/occupancy lighting installed in all buildings	Yes
Electricity purchased by the MBTA reduced by 20% per passenger mile	Not Applicable - Not the MBTA
Objective: Reduce electricity use by outdoor lighting	
Indicator	Contribution
Use of incandescent bulbs eliminated	Yes
Outdoor lighting assets + technology inventoried	Yes
50% of all outdoor lighting (ROW, parking lots, tunnels, runways, airfields) retrofitted	Yes
100% of all outdoor lighting retrofitted	Yes
Electricity consumption for lighting reduced by 50% through retrofits and operations	Yes
All traffic signals replaced with LED bulbs	Not Applicable - we have no traffic signals

Objective: Reduce fuel use for heating buildings + water	
Indicator	Contribution
Audit of all heating systems + water fixtures conducted + opportunities for retrofit identified	No
Temperatures of all adjustable boilers/heaters reduced	Yes
All inefficient / electric water heaters replaced with high efficiency tanks or tankless systems	Yes
Oil heating systems converted to natural gas or renewable alternatives where feasible	No
Geothermal + cogeneration heating systems studied for all new buildings	Not Applicable - no new buildings
Envelops of all buildings are evaluated and prioritized for insulation upgrades	Not Applicable -, we only have the one building and we monitor/replace/improve as necessary
Total heating fuel + costs for MassDOT-owned buildings reduced by 20%	Not Applicable - not MassDOT
Total heating fuel + costs for MassDOT-owned buildings reduced by 35%	Not Applicable - not MassDOT
Insulation of all heated / air conditioned buildings assessed and replaced as needed	Yes
All MassDOT-owned HVAC systems +/- windows retrofitted or replaced	Not Applicable - not MassDOT
Shade tree planting around MassDOT buildings increased to improve building energy performance	Not Applicable - not MassDOT
50% of all inefficient / electric water heaters replaced with high efficiency tanks or tankless systems	Yes
Objective: Reduce electricity consumption by subways + trolleys	
Indicator	Contribution
Evaluation of on-board and/or wayside energy recapture conducted for all subway lines	Not Applicable - Do not operate rail
Electrical systems of all subway lines evaluated and retrofitted where cost effective	Not Applicable - Do not operate rail
All outdated transit vehicles replaced with high efficiency cars	Not Applicable - Do not operate rail
New subway car purchases contain regenerative braking technology	Not Applicable - Do not operate rail
RFR issued for wayside station regeneration installation	Not Applicable - Do not operate rail

Goal 2: Increase Reliance on Renewable Energy	
Objective: Participate in MassDOT Energy Initiative	
Indicator	Contribution
Create a MassDOT energy management plan	Not Applicable
All energy consumption (electricity / heating / fleet fuel) tracked + centrally reported	Yes
Feasibility study completed for additional wind power generation sites on MassDOT properties	Not Applicable - not MassDOT
Objective: MassDOT GreenDOT Implementation Plan Increase energy produced at MassDOT facilities	
Indicator	Contribution
Comprehensive feasibility assessment and renewable energy generation plan completed	No
4 RFR's issued by MassDOT for additional renewable generation sites	Not Applicable
10 new renewable energy projects installed at MassDOT facilities	Not Applicable - not MassDOT
At least 5% of electricity demand generated by MassDOT renewable projects	Not Applicable - not MassDOT

Objective: Purchase more renewable energy	
Indicator	Contribution
Bulk purchasing of green electricity portfolio with other state agencies initiated	No
12% of electricity needs met through production or green energy purchases	Yes
25% of electricity needs met through production or green energy purchases	Working towards

6.23 Land

Land goals are aimed at using sustainable vegetation maintenance practices and protecting significant habitat areas and natural landscapes. Many of the indicators are not applicable because there are no significant habitats on CATA property and there is little vegetation to maintain.

There are 45 indicators for land but only 19 (42%) are applicable to CATA. CATA is meeting 9 (47%) applicable land indicators as seen in Figure 46. Figure 47 outlines the land indicators by implementation time and level of achievement. There are 26 indicators in the land theme which are not applicable to CATA. For the applicable indicators 13 are short term indicators, 6 are medium-term, and 0 long-range. Of those that are applicable to CATA they have met 7 (54%) of the immediate implementation (2013) indicators and are working towards or meeting 2 (33%) of the medium-term (2015) indicators.

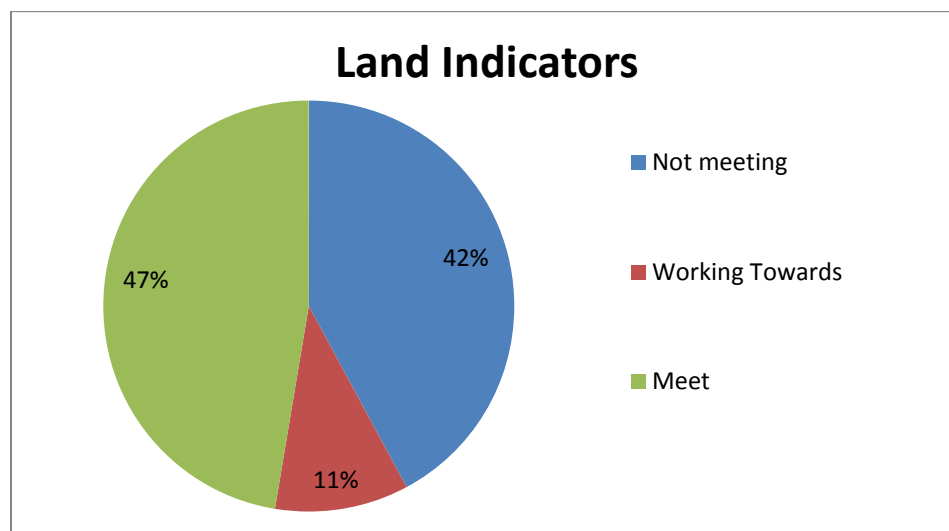


Figure 46. Land Indicators Level of Attainment

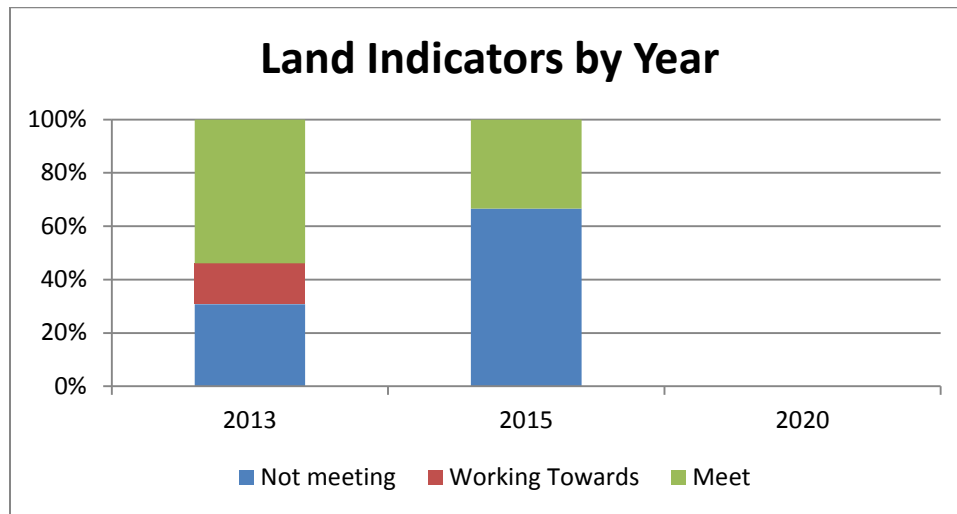


Figure 47. Land Indicators Attainment by Year

Table 15. Land Goal Achievement

Goal 1: Minimize Energy + Chemical Use in Maintenance	
Objective: Increase acreage of land planted with native / low maintenance vegetation	
Indicator	Contribution
New facilities planted with sustainable, minimally managed native landscape	Not Applicable - no new facilities have been constructed
Lawn installations around five facilities replaced with natural (low maintenance) vegetation	No
Native plant restoration or managed fallow habitat restoration increased 25% along ROWs	No
Available land surrounding all rural depots and offices planted with native vegetation	Not Applicable - not in a rural area
Objective: Decrease area + frequency of land mowed	
Indicator	Contribution
Inventory of grassed area conducted	No - we only have one building and associated grassed area
Turf grass replaced with broad spectrum blend of grasses including warm season + slow growing for low maintenance	No
Mowing frequency reduced by 25%	No
Mower blades raised in turtle habitat + areas contiguous with natural areas as standard operating procedure	Not Applicable - CATA's building does not fall within the indicated areas
Mowing + brush cutting jobs are scheduled around animal nesting season to the maximum extent possible	Not Applicable - the total size of our land is 5.93 acres, so this doesn't apply (http://gis.vgsi.com/gloucesterma/Parcel.aspx?Pid=13897)

Objective: Implement an integrated vegetation management approach for ROWs + facilities	
Indicator	Contribution
Landscape areas inventoried by habitat area + maintenance regime	Working towards - we have one landscape area and we contract out the maintenance
Adopted Vegetation Management Plans focus on integrated management approach	Not Applicable - We contract out the mowing of our grass. That is our vegetation mgmt plan
Soil augmentation utilize organic landscape techniques + minimize nutrient loads to water supplies	Not Applicable - we don't use soil augmentation
Compost materials used as the preferred soil amendment in all maintenance + construction projects	Not Applicable - no projects this would apply to
Objective: Require intelligent use herbicides + pesticides in construction + maintenance	
Indicator	Contribution
Mechanical weed control utilized to minimize traditional herbicide use	Yes
Herbicides used only in conjunction with integrated + sustainable roadside/railway vegetation management plans	Working towards
Increase number of employees trained for herbicide application to allow more selective application	Not Applicable - we contract this service out
Integrated pest management (IPM) implemented for all maintenance projects + construction sites	Not Applicable - no projects
Ongoing training for employees + technical assistance for municipalities on organic/IPM practices established	Not Applicable - we contract this service out
Objective: Protect, preserve + enhance woodland + urban tree coverage	
Indicator	Contribution
2 to 1 tree replacement policy implemented where woodland preservation desired	Not Applicable - we haven't removed any trees
Mature, healthy tree preservation is maximized in maintenance and project design where feasible	Yes
Trees and naturalized landscaping emphasized in revised Project Development + Design Guide	Yes
Sustainable roadside woodland management plan established for construction and maintenance	Not Applicable - we haven't had a project
Urban street tree coverage enhanced during improvement projects	Not Applicable - we haven't had a project
Coordinated tree planting policy established to encourage locally supported urban forestry practices	Not Applicable - we haven't had a project
100,000 trees planted along roadways as part of MassDOT's Complete Streets practices	Not Applicable - we haven't had a project

Goal 2: Enhance Ecological Performance of MassDOT Impacted Land

Objective: Increase habitat preservation + enhancements	
Indicator	Contribution
Proactively coordinate project development with MA Department of Fish + Game	No
Restored + maintained areas increased for non-urban construction projects	Not Applicable
25 nest boxes installed at appropriate locations	No
Surplus land with high natural resource value evaluated for transfer to appropriate state agencies	Not Applicable - we don't have surplus land with a high percentage of natural resources
Grassland and/or Woodland Management Plans in place for all appropriate facilities	Yes
Wildlife + endangered species training program provided for applicable employees	Not Applicable
Ten rare species habitat management/ enhancement projects initiated within right-of-way	Not Applicable - CATA's building does not fall within the indicated area
Objective: Increase wildlife accommodation along ROWs + facilities	
Indicator	Contribution
Wildlife hazard mitigation plan(s) implemented for all facilities	No
Reptile + amphibian + fish passage structures incorporated into maintenance activities	Yes - we take measures to protect the pond located on our property
Project forms revised to include wildlife accommodations measures early in design review	Yes
Wildlife fencing along ROWs/properties within all critical habitat areas evaluated + installed	Not Applicable - CATA's building does not fall within the indicated areas
Objective: Decrease quantity of invasive + noxious species	
Indicator	Contribution
Planting of all listed noxious or invasive species prohibited	Yes
All stockpiled materials screened for noxious or invasive species	Not Applicable - we don't stockpile materials
Transportation of cut wood materials limited to avoid beetle + other pest transportation	Not Applicable - we don't transport wood
Aggressive species early detection + rapid response program in place	Not Applicable -
Invasive species control on sites are managed with minimal adverse impact on other species	Not Applicable
Active invasive species management programs in place within priority habitat areas	Not Applicable
All maintenance crews trained on invasive species detection	Not Applicable
Objective: Decrease outdoor light pollution	
Indicator	Contribution
New lighting designed to conserve energy + avoid light pollution	Yes
Light shields installed in coordination with roadway + parking lot lighting fixture retrofits	Yes

6.24 Materials

Material goals include using environmentally friendly products; using innovative materials and construction techniques that leave smaller environmental footprints; and having green facilities. CATA is working towards using more environmentally friendly products and increasing recycling at their facility.

There are 63 indicators for materials but only 35 (56%) are applicable to CATA. CATA is meeting 20 (57%), working towards 4 (11%) and not meeting 11 (31%) of the applicable material indicators as seen in Figure 48. Figure 49 outlines the material indicators by implementation time and level of achievement. There are 28 indicators in the materials theme which are not applicable to CATA. For the applicable indicators 20 are short term indicators, 12 are medium-term, and 3 long-range. Of those that are applicable to CATA they have met 12 (60%) of the immediate implementation (2013) indicators, and are working towards or meeting 7 (58%) of the medium-term (2015) indicators and 1 (33%) of the long-range indicators.

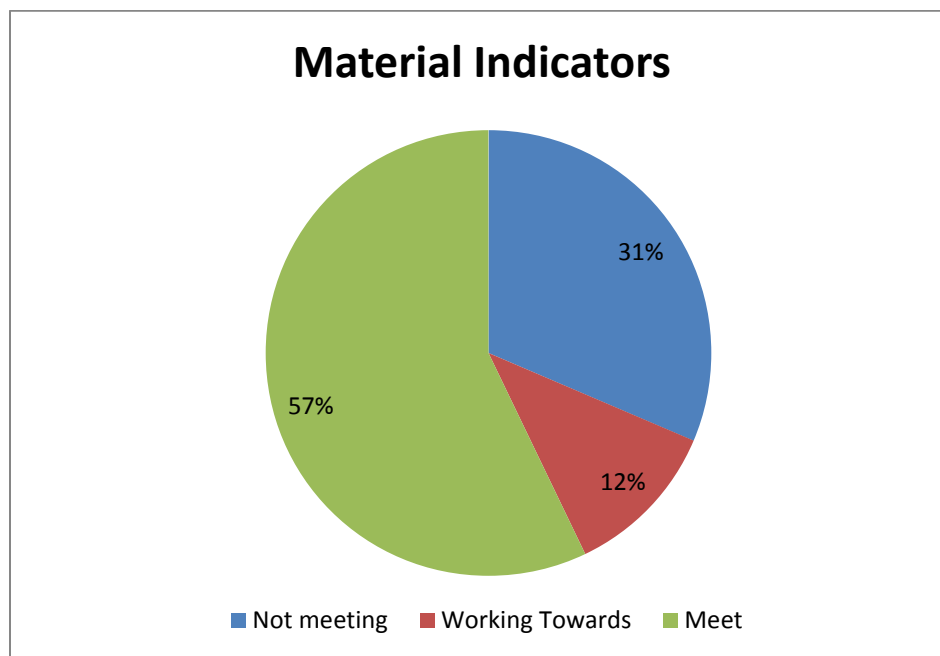


Figure 48. Materials Indicators Level of Attainment

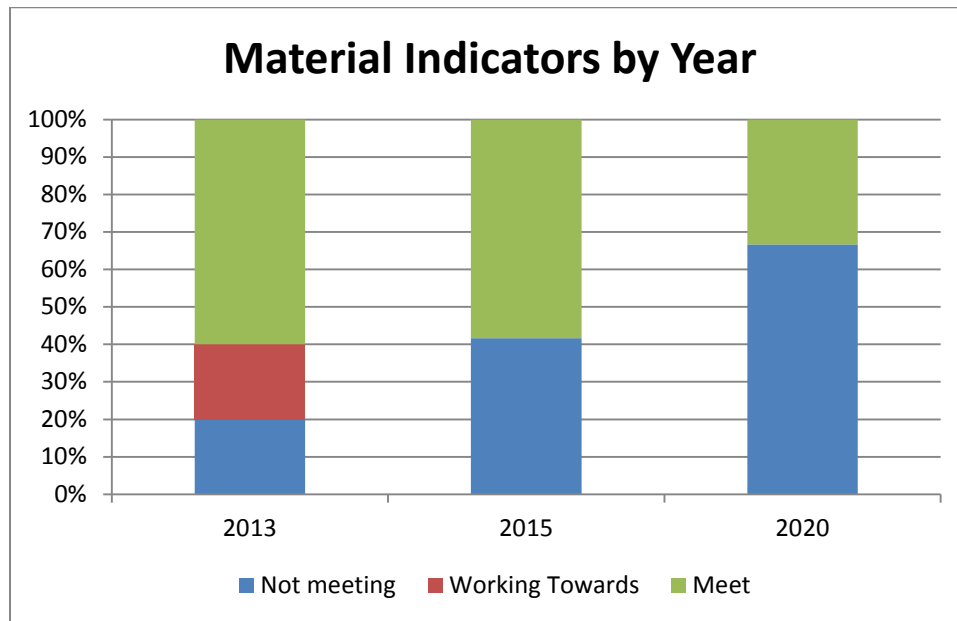


Figure 49. Material Indicators Attainment by Year

Table 16. Material Goal Achievement

Goal 1: Purchase Environmentally Preferred Products	
Objective: Implement an environmentally preferred materials purchasing program	
Indicator	Contribution
Environmentally preferred materials purchasing programs implemented in collaboration with OSD	Yes - we purchase environmentally preferred materials, but didn't collaborate with OSD
Low or no volatile organic compound furniture + flooring purchased	Working towards
100% recycled content paper products purchased	Working towards
Reclaimed + recycled materials utilized for landscaping + earthwork	No
Only refrigerators with low Global Warming Potential (GWP) refrigerants and insulation purchased	Yes
Sustainable Forestry Certified wood for permanent or temporary construction utilized	Not Applicable - no recent projects
Standards for recycled content of traffic control/safety devices developed	Not Applicable - we don't have traffic control devices
Sustainability practices integrated into all construction and service contract evaluation criteria	Yes
Objective: Purchase energy efficient equipment	
Indicator	Contribution
Only Energy Star or Electronic Product Environmental Assessment Tool certified electronic products purchased	Yes
Total electronic appliances within office locations reduced	No - we have the same number of appliances now as we did in 2010
Energy efficient criteria utilized for shop equipment + machinery purchases	Yes

Objective: Use environmentally friendly cleaning products + procedures	
Indicator	Contribution
Maintenance products + procedures utilized that pose least harm to humans + the environment	Yes
Protocols for disposal of all cleaning product waste established	Yes
Environmentally friendly cleaning products purchased when available	Yes
Environmental friendly cleaning products required to be used within vendor service contracts	Yes
Objective: Reduce hazardous chemical use in operations + maintenance	
Indicator	Contribution
Hazardous materials substitution program developed	Not Applicable - only waste oil
Hazardous materials spill prevention control and countermeasures plan created	Yes
Lead free wheels purchased and steel weighted wheels phased in to replace older wheels	Yes
Natural or organic fertilizers, pesticides, + landscaping materials purchased	Yes - we contract this service out, but this is included in the contract
Low or no volatile organic compound paints applied on indoor facilities	Not Applicable - haven't painted recently
Purchasing lists + disposal protocols for engine service + maintenance standardized	Yes
Technology implemented reducing the quantity of salt applied to roadways proportional to weather conditions	Yes
Objective: Increase opportunities for local vendors or locally sourced products sold at facilities	
Indicator	Contribution
Vendor solicitation for MassDOT facilities written to encourage local ownership / sourced products	Not Applicable - not MassDOT
Lease language for MassDOT facilities written to encourage locally sourced products	Not Applicable - not MassDOT
Local vendors + locally sourced products sold at MassDOT facilities doubled	Not Applicable - not MassDOT

Goal 2: Improve Life-Cycle Impacts of Investments	
Objective: Reduce energy inputs into paving operations	
Indicator	Contribution
Warm asphalt mix chosen as the standard state specification and hot mix asphalt eliminated	No
Two pilots of cold in-place paving completed	Not Applicable - no paving projects
Standard specifications + guidelines for expansion of cold in-place paving established	Not Applicable - no projects this would apply to; we would follow the city's guidelines and/or best practices should a project be undertaken
Two pilots of full depth reclamation advertised	Not Applicable - no projects this would apply to; we would follow the city's guidelines and/or best practices should a project be undertaken
Standard specifications + guidelines for expansion of full depth reclamation projects established	Not Applicable - no projects this would apply to; we would follow the city's guidelines and/or best practices should a project be undertaken
Research to increase the recycled content, reduce energy inputs, and improve vehicle efficiency of paving completed	Not Applicable - MassDOT responsibility

Objective: Increase total volume of materials sourced within 200 miles of construction site	
Indicator	Contribution
Total weight/volume/cost of material purchased locally (within 200 miles) measured in all projects	Working towards - we haven't had a lot of projects, but can consider adding this in the future
Product source information added to bidding requirements	Working towards - we haven't had a lot of projects, but can consider adding this in the future
Cost share of locally sourced materials increased 20% on state funded projects	No - this has not been a priority
Objective: Increase % of recycled materials in paving + concrete installations	
Indicator	Contribution
20% of recycled paving material content used in road resurfacing projects	Not Applicable - we don't resurface
25% recycled paving material content used in road reconstruction projects	Not Applicable - we don't do road construction
The highest recycled content paving and base material available utilized for shared-use paths	Not Applicable - we have had no projects this would apply to; we would follow the city's guidelines and/or best practices should a project be undertaken
Use of recycled rubberized asphalt + rubberized asphalt sealer increased	Not Applicable - we have had no projects this would apply to; we would follow the city's guidelines and/or best practices should a project be undertaken
Minimum 25% fly ash, slag concrete, or silica fume utilized	Not Applicable - we have had no projects this would apply to; we would follow the city's guidelines and/or best practices should a project be undertaken
Innovative sustainable concrete construction techniques encouraged in contracts	Not Applicable - no recent projects
20% recycled coarse aggregate concrete used in all suitable applications	Not Applicable - no recent projects
Objective: Increase albedo factor in hardscapes, rooftops + paving	
Indicator	Contribution
Solar Reflectivity Index minimum of 78 instituted for all roofing projects	No - concern was with cost and recent product failures concerning the white material
Two innovative roofing (green, vegetation or blue water) projects piloted	No
All new roofing installations utilize high measured albedo factor materials	No - concern was with cost and recent product failures concerning the white material
Albedo factor increased in paving surfaces + hardscape materials	Yes
Urban roadways + parking lots designed to maximize shade coverage of asphalt + concrete surfaces	Not Applicable - no new parking lots
Solar Reflectivity Index of at least 30 required for paving projects	Not Applicable - no recent projects

Objective: Design for deconstruction + reuse	
Indicator	Contribution
Road rehabilitation standards developed for reuse of existing installations	Not Applicable - we don't rehab roads
Expertise in designing for deconstruction specified in all RFRs for design contracts	Not Applicable
Procurement criteria include incentives to contractor bids utilizing higher recycled content materials	Yes
Lifecycle analysis in design, project alternative + material selection included	Yes
Readily reusable + renewable materials encouraged in design specifications	Yes

Goal 3: Build Green Facilities for MassDOT	
Objective: Design all new facilities to green building standards	
Indicator	Contribution
New facilities funded or built by MassDOT over 20,000 sq. ft. designed to MA LEED Plus	Not Applicable - no new facilities
New facilities funded by MassDOT designed to LEED Gold or Net Zero Energy Building standard	Not Applicable - no new facilities
Objective: Retrofit existing facilities to meet environmental design criteria	
Indicator	Contribution
All window AC units removed from office buildings or replaced with Energy Star units	Yes - already served by transit
Three building retrofits to LEED Existing Buildings Operations + Maintenance (EBO+M) initiated	No
Air circulation/filtration of MassDOT owned indoor facilities improved	Not Applicable - Not MassDOT employees
Wildlife fencing along ROWs/properties within all critical habitat areas evaluated + installed	Not Applicable - not MassDOT
Objective: Relocate offices + encourage healthy transportation options	
Indicator	Contribution
Offices in town or city centers relocated to be served by transit, walking + bicycling	Yes - already served by transit
Provide transit pass exchange for employees with subsidized parking benefits	No
Free parking + take home vehicles for MassDOT urban office employees eliminated	Not Applicable - Not MassDOT employees
Objective: Consolidate office + maintenance facilities where feasible	
Indicator	Contribution
MassDOT office + maintenance facility consolidation opportunity study completed	Not Applicable - not MassDOT
One office consolidation site piloted	No
Three pilot consolidation and/or cross utilization maintenance sites piloted	No

6.25 Planning, Policy & Design

Planning, policy, and design goals are aimed at developing a multi-modal system designed to promote healthy transportation and livable communities. CATA provides year-round bus service to the Rockport, Gloucester, and West Gloucester Commuter Rail Stations and additional summer service to the Ipswich Commuter Rail Station. During the summer months, CATA provides additional bus service between the commuter rail stations in the Cape Ann area and local attractions, such as Rocky Neck, Bear Skin Neck, and numerous beaches (Figure 50). By providing a link between the commuter rail stations, local neighborhoods, and popular tourist attractions, CATA is helping the Cape Ann community work towards a multi-modal transportation system which promotes non-automobile alternatives and increases the mode shift away from cars.



Figure 50. Seasonal service is provided to popular tourist attractions

There are 56 indicators for planning, policy and design but only 34 (61%) are applicable to CATA. CATA is meeting 16 (47%), working towards 8 (24%) and not meeting 10 (29%) of the applicable indicators as seen in Figure 51. Figure 52 outlines the planning, policy and design indicators by implementation time and level of achievement. There are 22 indicators in the theme which are not applicable to CATA. For the applicable indicators 13 are short term indicators, 19 are medium-term, and 1 long-range. Of those that are applicable to CATA they have met 7 (54%) of the immediate implementation (2013) indicators, and are working towards or meeting 15 (79%) of the medium-term (2015) indicators and 0 (0%) of the long-range indicators.

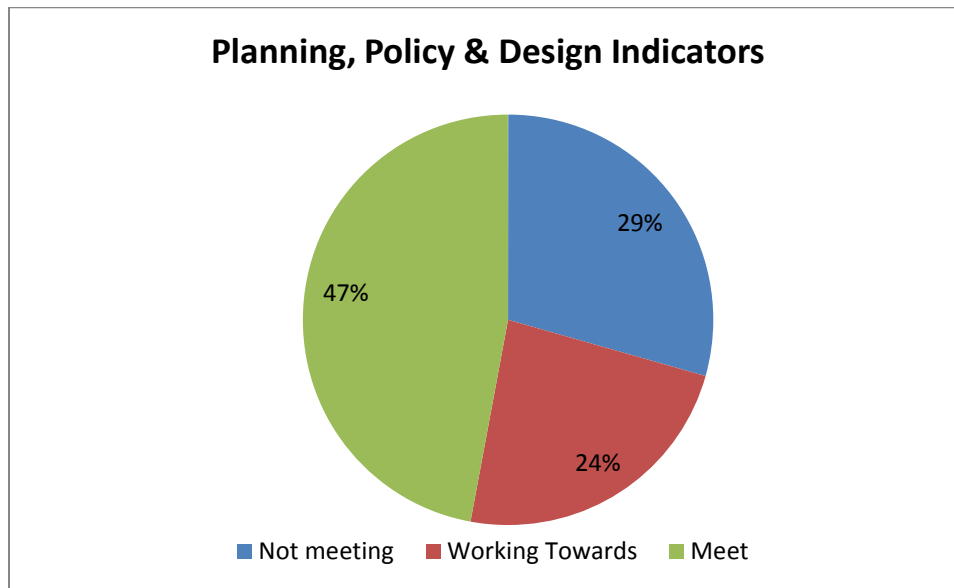


Figure 51. Planning Indicators Level of Attainment

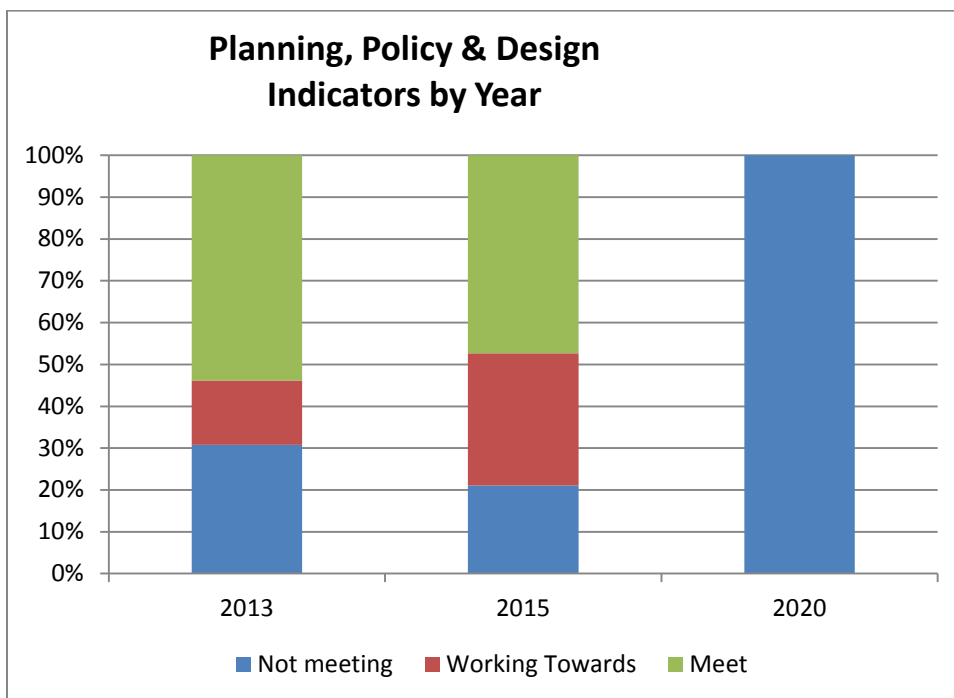


Figure 52. Planning Indicators Attainment by Year

Table 17. Planning, Policy & Design Goal Achievement

Goal 1: Design a Multi-Modal Transportation System	
Objective: Increase delivery of Complete Streets projects	
Indicator	Contribution
Bicycle + pedestrian facilities featured + prioritized in designs, rather than simply accommodated	Not Applicable - haven't had a project this would apply to
Project forms + databases revised to track Complete Streets + sustainability measures	No - we haven't had a project this would apply to
Update of Project Development + Design Guide underway to reflect evolution of Complete Streets	No - we haven't had a project this would apply to
Surfaces and facilities of at-grade rail crossings improved for pedestrian + bicycle travel	Not Applicable - not at grade crossings
All 'driveway' approaches to MassDOT airports, rail stations + MassDOT provide bicycle + pedestrian access	Not Applicable - CATA does not operate a commuter rail station; two of the three stations we serve provide bicycle and pedestrian access (Rockport and Gloucester), the other station is not pedestrian friendly (West Gloucester)
Objective: Increase bicycle parking + access to transit	
Indicator	Contribution
Transit stations with significant customer car parking (>50 spaces) have covered +/- secure bicycle parking	Not Applicable - no transit station
All MBTA + RTA buses equipped with bicycle racks	Working towards - 30% of fixed route
Study + pilot programs completed evaluating options for eliminating peak hour restrictions of bikes on transit	Not Applicable - no bikes on vehicles
Bike stations at North, South, and Back Bay stations established with showers + locker facilities	Not Applicable - Do not operate these stations
High capacity bicycle coaches operated on all commuter rail lines + peak-hour access restrictions lifted	Not Applicable - Do not operate Commuter rail
Bicycle access to heavy rail lines expanded to all hours except two 1-hour peak periods	Not Applicable - Do not operate rail
Objective: Improve traffic controls to reduce vehicle emissions, + to support walking + biking	
Indicator	Contribution
Inventory of traffic signals + grade crossing signal conducted	Not Applicable - we don't have signals or grade crossings
All signals evaluated and adjusted for optimal operations for all users	Not Applicable - no traffic signals
Objective: Improve transit system performance statewide	
Indicator	Contribution
Bus stop consolidation on key routes assessed	No
All RTA's have conducted comprehensive service analysis to improve system connectivity + efficiency	Yes
Opportunities for express bus lanes + regional bus services analyzed	Working towards
Transit operation efficiency improved while maintaining/increasing ridership	Working towards
Transit Signal Priority for all new traffic signals implemented	No
Payment + boarding system for MBTA light rail + vehicles + buses improved	Yes - new fareboxes
Green Line extension + South Coast Rail service completed	Not Applicable - Do not operate rail

Goal 2: Promote Healthy Transportation + Livable Communities
Objective: Encourage walking, biking, + transit as active transportation

Indicator	Contribution
MassDOT Bay State Bike Week facilitated + promoted annually in partnership with MassBike	Working towards
All office locations have visible bicycle parking locations for visitors near entrances	Working towards
Selection of public meeting venues prioritizes locations with transit, pedestrian + bicycle access	Yes - Rose Baker is accessible by all modes of transportation
Information on transit, bicycle + pedestrian travel provided on public meeting announcements	No
MassDOT sidewalks + bicycle facilities are cleared of snow + ice simultaneously with vehicle lanes	Yes
Navigational signage to transit stations expanded along local roads and highways	Yes - added bus logo to sign along 128 directing people to the park and ride lot at Stage Fort Park
Employees + contractors required to use transit, walk, bike or carpool to meetings whenever location + service schedules allow	No - not required
40% of elementary + middle schools reached through Safe Routes to Schools program	Not Applicable

Objective: Promote eco-driving + programs to reduce reliance on single occupancy vehicles

Indicator	Contribution
Eco-driving promoted through digital display boards + customer facilities	Not Applicable - we don't have digital display boards nor customer facilities

Expand commuter options programs

Objective: Indicator	Contribution
Commuter options programs through digital displays promoted statewide	Not Applicable - we don't have digital displays
Parking spots at major transit stations with parking reserved for car sharing	Not Applicable - no transit stations
Covered +/- or secure bicycle parking installed at major park + ride facilities	Not Applicable - no park and rides
Secure indoor bicycle parking + shower facilities provided at all major MassDOT employment centers	Yes

Objective: Utilize surplus land, parking lots + air rights for transit-oriented developments

Indicator	Contribution
All properties, including air-rights, studied for development feasibility	No - we don't own or operate any transit stations
Large parking lots at transit stations analyzed for TOD redevelopment in the Commuter Rail Master Plan	Not Applicable - we don't own or operate any transit stations
Four new RFP's issued for land development	No
At least two mixed use developments on MBTA properties initiated	Not Applicable - Not the MBTA

Goal 3: Triple Bicycling, Transit + Walking Mode Share	
Objective: Connect land use planning with transportation planning + investments	
Indicator	Contribution
Transit authorities participate in all MassDOT and MPO corridor studies	Yes
RTA's participate in MassDOT MEPA review and mitigation formation	Yes - if a project required this, we would
Land use + transportation planning strategies to support mode shift incorporated into 2016 RTPs	Yes
GreenDOT Implementation Plan activities incorporated into MPO's Unified Planning Work Programs	Yes - Yes, GreenDOT Implementation Plan activities are incorporated in our current UPWP (specifics are in Chapter 1 at http://ctps.org/Drupal/data/pdf/plans/UPWP/FFY_2015_UPWP_062614.pdf). Our focus areas for the UPWP address mode share/mode shift, air quality and environmental issues, and statewide initiatives such as GreenDOT; specifics are outlined in the beginning of Appendix C in the current UPWP.)
Project evaluation criteria that prioritize mode shift, GreenDOT + GHG reduction adopted by MPOs	Yes - Yes, the project evaluation criteria consist of 35 questions across six policy categories. This TIP evaluation criteria graphic contains an overview of the policy categories, their point values and criteria measures. The TIP project selection criteria awards points for projects that reduce auto dependency, reduce VMT/VHT, promote GreenDOT, and reduce GHGs. These criteria are contained within the Livability and Economic Development and Environment and Climate Change categories.
Complete Commuter Rail Master Plan to evaluate options to expand capacity + increase ridership along each line	Not Applicable - Do not operate commuter rail
Priority Development Areas (PDAs) + Priority Protection Areas (PPAs) approved by HED established in all MPOs	Working towards - A majority, but not all of the communities in the Boston Region MPO have been involved in MAPC planning work to identify PDAs and PPAs. This MAPC map identifies the regionally significant PDAs and PPAs within the MPO region: ftp://ftp.mapc.org/CTPS_Priority_Area_Data/RegionMap.pdf . If you have further questions regarding the PDAs and PPAs in the region, please contact Eric Bourassa at ebourassa@mapc.org or 617-933-0740.
Strategic regional visions for 'zero' SOV growth + GHG reduction adopted by MPOs	Working towards - The MPO is developing its goals and objectives as part of the development of the next long-range transportation plan. There is a Clean Air/Clean Communities goal to create an environmentally friendly transportation system with a specific objective to reduce greenhouse gases.
State-of-the-practice metric for measuring bicycle and pedestrian quality of roadways utilized in corridor planning + design	Yes - In our corridor planning studies, MPO staff takes a multimodal approach to address the needs of all users, including bicyclists and pedestrians. MPO staff considers recent crash data, existing sidewalk and bicycle infrastructure, crossing distances, signal equipment and timing, vehicle speeds, traffic volumes, pavement condition, and various other factors in developing recommended improvements for future design and construction.

Objective: Stabilize travel demand growth on roadways from single occupancy vehicles	
Indicator	Contribution
All rail stations are accessed by Complete Streets	No - not the West Gloucester Station
Objective: Collect data regarding factors influencing mode choices + utilize better planning tools	
Indicator	Contribution
Person Miles Travelled (PMT) for all modes measured and/or estimated annually at state and regional levels	Yes
Public health impacts of major transportation projects considered in project selection criteria	Yes
New methods for collecting travel data for bicycles and pedestrians piloted	Yes - The MPO conducts ongoing bicycle and pedestrian planning activities that aim to increase walking and biking by improving access to safe, healthy, efficient nonmotorized transportation options in the Boston region. Planning efforts include: · Conducting studies to improve walking and bicycling conditions in urban and suburban settings; · Providing technical assistance to cities and towns on improving conditions for bicyclists and pedestrians. In support of these planning efforts, the MPO collects and gathers data on bicycle and pedestrian travel volumes, incidence of crashes, bicycle parking at transit stations, and other subjects. Data on bicycle and pedestrian travel volumes can be found online at the Bicycle and Pedestrian Count Database. The volunteer registration and tutorial for the Count Program are here. MPO staff have explored new methods for collecting bicycle and pedestrian counts, however we have not yet piloted any of these methods.
Scenario planning methods utilized by MassDOT and MPOs instead of traditional growth trend forecasts	Yes
Traffic model assumptions for road design revised to assume limited traffic growth rather than historic VMT growth trends	- I don't think I can give you a thorough answer to this question. Our modeling staff regular update assumptions based on existing trends, and these assumptions influence growth projections.
MassDOT conducts travel demand forecasts with an activity based model	Not Applicable
Objective: Increase training opportunities on GreenDOT and Mode Shift	
Indicator	Contribution
Coordinated information gateway for shuttles and inter-city bus travel implemented	No
Programs for healthy transportation education and travel training for young + elderly travelers developed statewide	Working towards
Bay State Roads technical assistance offers materials on sustainability, mode shift, Complete Streets, and parking policies	Not Applicable - Not Bay State Roads

6.26 Waste

Waste goals aim to reduce the exposure to hazardous waste and minimize the disposal of waste. CATA is minimizing waste by recycling electronics, cartridges, batteries, as well as paper, and other products at the bus garage, educating employees on recycling, and implementing litter control programs such as trash bins on all vehicles. To reduce the exposure to hazardous materials, CATA is in compliance with a hazardous waste management plan.

There are 33 indicators for waste but only 24 (73%) are applicable to CATA. CATA is meeting 10 (42%), working towards 10 (42%) and not meeting 4 (17%) of the applicable waste indicators as seen in Figure 53. Figure 54 outlines the waste indicators by implementation time and level of achievement. There are 9 indicators in the waste theme which are not applicable to CATA. For the applicable indicators 12 are short term indicators, 9 are medium-term, and 3 long-range. Of those that are applicable to CATA they have met 8 (67%) of the immediate implementation (2013) indicators, and are working towards or meeting 6 (67%) of the medium-term (2015) indicators and 2 (67%) of the long-range indicators.

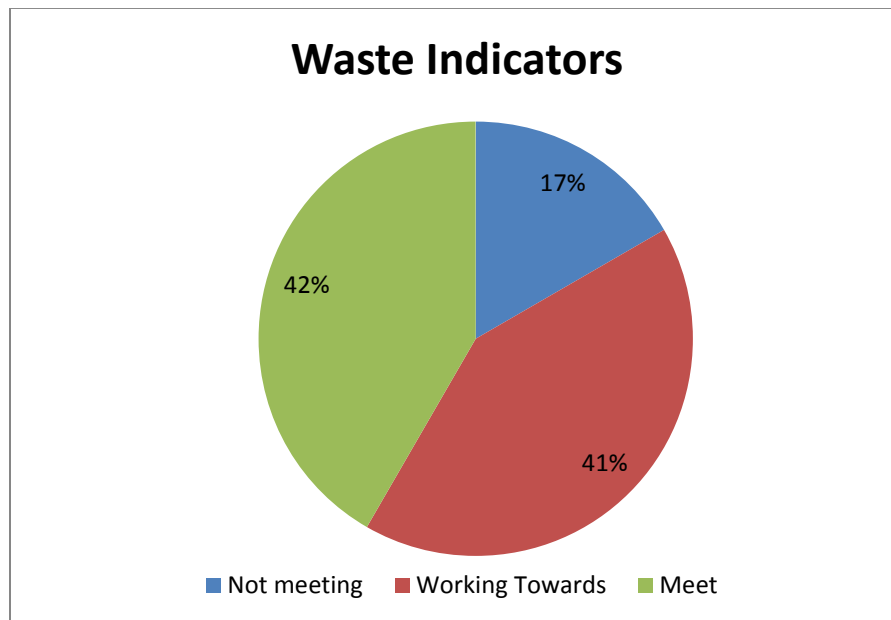


Figure 53. Waste Indicators Level of Attainment

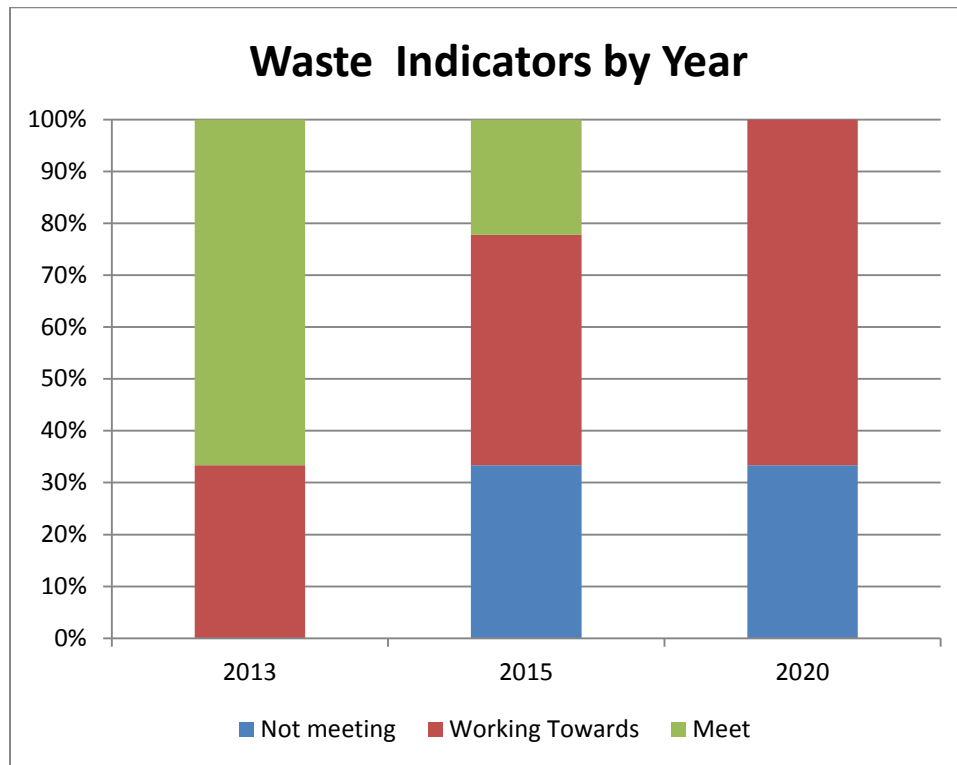


Figure 54. Waste Indicators Attainment by Year

Table 18. Waste Goal Achievement

Goal 1: Achieve Zero Solid Waste Disposal	
Objective: Increase the diversion rate of office waste	
Indicator	Contribution
Zero waste plan developed for MassDOT	Working towards
Full "single stream" recycling provided at all buildings	Working towards
All electronics, cartridges, batteries, + accessories recycled	Yes
Employee education program on recycling + waste reduction underway	Yes
15% reduction in solid waste from offices achieved	Yes
Office building composting or biomass heating piloted at two facilities	No
Waste reduction / recycling program emphasized in all janitorial service contracts	Yes
30% reduction in solid waste disposal achieved	Yes
Objective: Eliminate litter accumulation in ROWs + stations	
Indicator	Contribution
Litter control programs initiated in all corridors	Not Applicable
Litter prevention information provided at all rest areas + stations	Not Applicable

Objective: Provide "full-stream" recycling opportunities at all customer facilities	
Indicator	Contribution
Container + paper recycling installed at all rest area, airports, transit stations + RMV branches	Not Applicable
Mobile electronics + license plate recycling drop off provided at key locations	No
Objective: Decrease amount of waste generation during construction + maintenance	
Indicator	Contribution
Waste management plans developed for all construction projects	Yes
At least 65% of construction debris is reused or recycled	Working towards - we don't have a lot of projects, but we recycle what we can
At least 80% of construction debris is reused or recycled	Working towards - we don't have a lot of projects, but we recycle what we can
At least 90% of landscaping waste material is reused or composted	Working towards - we don't have a lot of projects, but we recycle what we can
Objective: Decrease paper use	
Indicator	Contribution
Paperless office procedures and equipment piloted in all offices	Working towards
Paper use is cut in half	Working towards - it has been reduced, but not as much as 50%
A paper-free office program adopted + implemented	No
Other paper products consumption (paper towels, napkins, etc.) reduced in all facilities	No

Goal 2: Reduce all Exposure to Hazardous Waste	
Objective: Implement Environmental Management System	
Indicator	Contribution
EMS systems adopted + implemented for all divisions	Not Applicable - we only have one division
All waste is managed in compliance with a hazardous waste management plan	Yes
Metrics of recycling + disposals reported from all sites	Yes
EMS data from all Divisions compiled annually into a central performance management system	Not Applicable - only one division
Best management practices for salt and sand storage in place at all depot facilities	Not Applicable - we contract out plowing; only a small amount of salt is on hand for two small sidewalks
Objective: Comply with waste ban + eliminate on-site storage	
Indicator	Contribution
100% compliance with state waste bans met at office + maintenance facilities	Working towards
Long-term storage of hazardous waste minimized	Yes
Objective: Increase recycling rate of hazardous materials	
Indicator	Contribution
Refrigerants with high global warming potential from HVAC + refrigerators recycled	Yes - we recycle whatever we can
80% of all hazardous waste generated is recycled where possible	Working towards - we recycle whatever we can
100% of hazardous waste with recycling potential is diverted	Working towards - we recycle whatever we can

Objective: Evaluate + remediate brownfield sites	
Indicator	Contribution
An assessment of all brownfield properties is completed	Not Applicable - CATA does not have any brownfields
Remediation / redevelopment of at least four properties underway	Not Applicable - CATA does not have any brownfields
Remediation / redevelopment at all known brownfield sites initiated	Not Applicable - CATA does not have any brownfields

6.27 Water

Water goals look to use less water and improve water systems. Many of these are not applicable because there has been no new construction. Where possible water has been conserved, such as with recycling water to wash vehicles.

There are 46 indicators for water but only 16 (35%) are applicable to CATA. CATA is meeting 7 (44%), working towards 0 (0%) and not meeting 9 (56%) of the applicable water indicators as seen in Figure 55. Figure 56 outlines the water indicators by implementation time and level of achievement. There are 30 indicators in the water theme which are not applicable to CATA. For the applicable indicators 8 are short term indicators, 5 are medium-term, and 3 long-range. Of those that are applicable to CATA they have met 6 (75%) of the immediate implementation (2013) indicators, and are working towards or meeting 1 (20%) of the medium-term (2015) indicators and 0 (0%) of the long-range indicators.

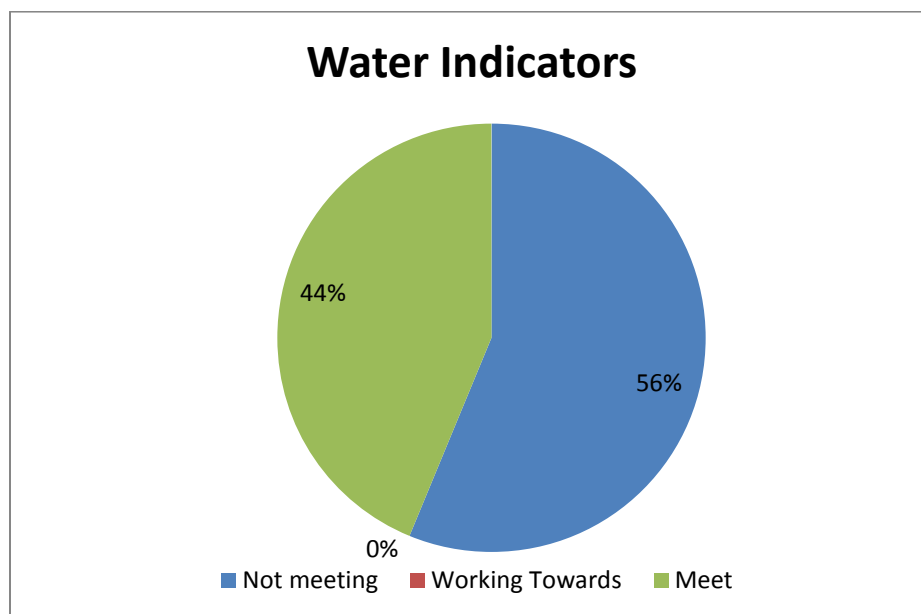


Figure 55. Water Indicators Level of Attainment

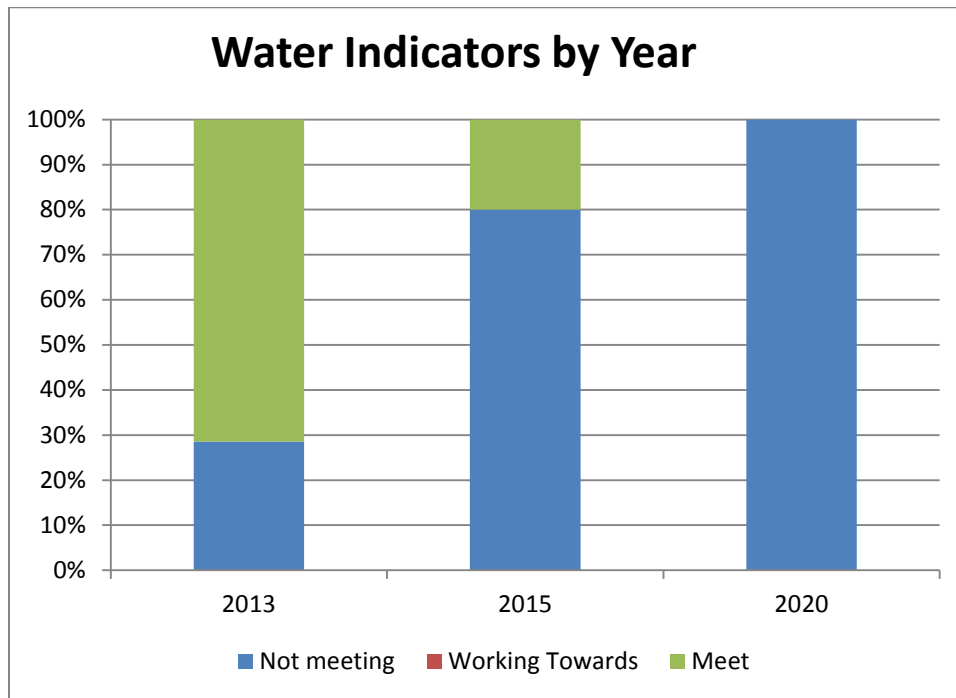


Figure 56. Water Indicators Attainment by Year

Table 19. Water Goal Achievement

Goal 1: Use Less Water	
Objective: Decrease potable water use in buildings	
Indicator	Contribution
The efficiency of all water fixtures in buildings evaluated	Yes
Fixtures retrofitted to gain a 10% reduction in water use	No
Plumbing system retrofitted to gain 20% reduction in water use	No
Objective: Decrease water use for irrigation	
Indicator	Contribution
Water conservation integrated into vegetation management plans	Yes
Potable water use for irrigation reduced by 25%	Not Applicable - we don't irrigate
Objective: Increase utilization of recycled water + rainwater	
Indicator	Contribution
Water conservation practices at bus, vehicle, or airplane washing facilities required	Yes
All new vehicle/bus/rail vehicle washing facilities designed and built with recycled water technologies	Not Applicable - no new facilities
All existing vehicle washing facilities evaluated for recycled or recaptured rain water alternatives	Not Applicable - we use recycled water now
Study of rooftop rainwater use for toilets / HVAC of largest office facilities completed	No
Rain barrels or other means to reuse rainwater + disconnect drain spouts from sewage systems installed	No

Objective: Install innovative dual plumbing water systems in facilities	
Indicator	Contribution
Water use innovations required in all new building proposals	Not Applicable - no new building proposals have been issued
Three new pilot structures or building retrofits utilizing dual plumbing completed	No

Goal 2: Improve Ecological Function of Water Systems

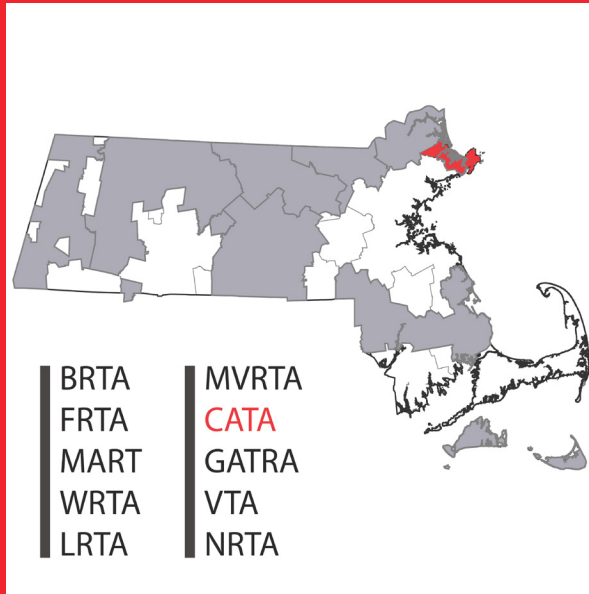
Objective: Minimize impacts + enhance wetlands + impaired waters	
Indicator	Contribution
Preservation + enhancement of wetlands is adopted in design instead of replacement	Not Applicable - we haven't had a project this would apply to
Environmental benefits of impact mitigation through watershed planning improved	Not Applicable - we haven't had a project this would apply to
Natural buffers between wetland resources + transportation infrastructure increased whenever possible	Not Applicable - we haven't had a project this would apply to
Alternative deicer agents utilized in areas with wetlands, coldwater fisheries, and water supplies	Yes - We only use a very small amount of deicer on two small sidewalks; the lot is just plowed
Five wetland restoration projects not considered mitigation completed	Not Applicable - we haven't had a project this would apply to
Objective: Adapt facilities for climate change resilience	
Indicator	Contribution
Climate change adaptation strategies initiated between local and federal parties	Yes - http://www.mass.gov/eea/pr-2014/coastal-grants.html
Revised extreme precipitation data utilized for rainfall, flood flow + stormwater calculations	Not Applicable
Climate Adaptation Plan applicable to all MassDOT facilities adopted	No - CATA has not
Statewide climate change vulnerability assessment for MassDOT facilities completed	Not Applicable - not MassDOT
Critical roadway or rail segments targeted for culvert replacement + rearming for scour protection	Not Applicable
Fish passage structures which meet state crossing standards included in maintenance activities	Not Applicable - we have a small body of water, but we haven't had a project this would apply to
All reconstruction projects crossing tidal habitats include measures to eliminate tidal flow restrictions	Not Applicable - CATA's building is adjacent to a Tidelands Jurisdiction 91 Marsh boundary-seaward
Objective: Minimize impacts of ROWs + bridges on fluvial processes	
Objective: Indicator	Contribution
New roadways + bridges designed to maximize natural fluvial processes including tidal flushing	Not Applicable - we have a small body of water, but we haven't had a project this would apply to
At minimum 12 bridge replacement projects improving water flow under construction or completed	Not Applicable - we have a small body of water, but we haven't had a project this would apply to
All railroad bed reconstruction projects retrofitted with enhanced stream crossing standards	Not Applicable - Do not operate rail
The standards within MA Stream Crossing Handbook utilized in all project development processes	Not Applicable - we haven't had a project this would apply to
A minimum of five culverts redesigned + rebuilt for improved fish migration	No - we have a small body of water, but we haven't had a project this would apply to
All projects crossing tidal habitats evaluated for restriction of tidal flow	Not Applicable - CATA's building is adjacent to a Tidelands Jurisdiction 91 Marsh boundary-seaward

Objective: Reduce stormwater volumes + increase permeable surface areas	
Indicator	Contribution
Environmentally sensitive site design in new construction projects utilized	Not Applicable - we haven't had a project this would apply to
Post peak discharge rates held to less than pre-project discharge rates to the maximum extent possible	Not Applicable - we haven't had a project this would apply to
All projects designed to remove solids + pollutants to the maximum extent possible	Not Applicable - we haven't had a project this would apply to
All projects designed to include measures to increase infiltration + reduce stormwater volumes	Not Applicable - we haven't had a project this would apply to
Permeable paving or other infiltration installations included in parking lot resurfacing projects	Not Applicable - we haven't had a project this would apply to
Design charette conducted for creating "green roof" bus shelters for the MBTA and/or major RTA	No
Green roof installed on at least one large bus or rail maintenance garage	No
Objective: Decrease non-point source pollutant discharges	
Indicator	Contribution
All structural best management practices inspected annually + cleaned as necessary	Yes
Illicit discharges from MassDOT structures eliminated upon detection	Not Applicable - not MassDOT
Long-term pollution prevention programs implemented at all maintenance sites	
Environmentally sensitive design / Low Impact Design (LID) utilized in all construction projects	Not Applicable - we haven't had a project this would apply to
New best management practices installed at all facilities identified by Impaired Waters Program	Not Applicable - it doesn't look like we have an impaired water on our property
Phytotechnology as part of stormwater evaluation + constructed stormwater controls utilized	Not Applicable - we haven't had a project this would apply to
Assessment protocol developed to evaluate water quality functions of roadside vegetation	Not Applicable - we don't have any roads, just our facility parking lot
Stormwater 'Low Impact Design' integrated into revised Project Development + Design Guide	Not Applicable - MassDOT responsibility
Commuter ferries follow best practices for fuel handling, bilge water, sanitary waste + trash disposal	Not Applicable - Do not operate ferries

6.2 Conclusion

With over 300 indicators, as identified in the GreenDOT policy only 55% are applicable to CATA. Overall CATA is meeting 46% of those. They are working hard to achieve the indicators but due to limited financial resources, it has been difficult. Some of the indicators which are applicable are joint responsibilities of CATA and either MassDOT, the planning commission, or the City or town, and they must work collaboratively to achieve success. Additionally many of the indicators just do not apply because they are specific to the MBTA; rail; require there has been or will be new construction; they are for MassDOT owned facilities, or they are for environmentally sensitive land areas.

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Chapter 7

AECOM / URS
TMD
 Burke & Company



7. RECOMMENDATIONS

7.1 Introduction

Recommendations were developed using a cumulative process that incorporated public outreach, a diverse steering committee, operational input from CATA, and analysis of existing transit service and the local/regional market. Strategies to improve the system were developed based on the goals and objectives outlined at the beginning of the plan. The recommendations are intended to better align service with local and regional demand using a three phase process that will serve to strengthen the system and attract more riders. A phased approach was used in order to establish the immediacy and prioritization of needs and was based on an incremental approach and available resources.

- Phase 1 – implement immediately
- Phase 2 - implement as resources and funding are available
- Phase 3 - implement as resources and funding are available

To be able to evaluate whether or not transit services are meeting system goals and objectives, an effective monitoring program should first be in place. A service monitoring program is important both in terms of gauging whether the goals of the community are being accomplished with the service and that the service is both effective and efficient. Without specific measures, success is difficult to measure from year to year. Service monitoring should be part of the daily operation based on specific data collection procedures. Data collection is essential to evaluating the service performance and to determining if changes should be made in the service delivery. To assist in developing a service monitoring program, recommended service guidelines and performance measures have been developed.

7.2 Strategies for Service Recommendation

For transportation planning purposes, a goal is defined as a purpose or need that should be attained to address a transportation issue. An objective is a specific, measurable method or activity that is designed to achieve the identified goal. The goals and objectives were developed at the onset of the planning process with CATA and have guided the development of the plan throughout. CATA specific goals are:

Goal #1: Increase Frequency of Service to Better Serve Senior Citizen Population

Objective 1.a: Work with senior citizen groups to outline service needs.

Objective 1.b: Adjust service options and frequencies to match with the identified needs.

Objective 1.c: Increase transit frequency and service options to make bus use an attractive transportation alternative.

Goal #2: Bridge the Gap Between CATA and MBTA Service in Communities Like Beverly

Objective 2.a: Develop and implement a plan to demonstrate benefits of CATA membership to Manchester and coordinate with MBTA for implementation.

Goal #3: Increase Transit Ridership From Tourism

Objective 3.a: Develop and implement better signage and promotion of existing park and ride facilities such as Stage Fort Park and Rockport Market park and ride.

Objective 3.b: Explore new locations for park and ride facilities that are easy to access and provide a quick ride to central tourist locations.

Objective 3.c: CATA will recalibrate its routes and park and ride facilities to provide transit service in areas that can effectively accommodate tourist parking.

Objective 3.d: Educate tourists about the bus system before they arrive.

Objective 3.e: Provide rider-friendly and accessible marketing material.

Goal #4: Improve Communication with Department of Public Works and Other Departments to Facilitate Improved Transit Service.

Objective 4.a: CATA will form a working committee with DPW and other departments to meet regularly to identify construction areas and plan ways to reduce impacts on transit in the CATA service area.

Goal #5: Improve the Current Transit Services

Objective 5.a: Improve frequency of service on high performing routes from current frequencies to 60 minutes during the weekday and Saturday.

Objective 5.b: To work with other RTAs and the MBTA to further the coordination of inter-regional connections between the CATA, adjacent RTAs and the MBTA.

Aside from the goals and objectives several other strategies/guiding principles were used in designing recommendations:

9. **Simplify** – Routes should be designed along main corridors with minimal schedule deviations. For routes that are not linear, service should be provided in both directions.
10. **Service should match demand** – The denser (both in terms of employment and population) areas should have a higher level of service with either higher frequency routes or multiple lower frequency routes. Major corridors often warrant higher frequencies. Routes that focus on connecting the High School to the community should be separated out as trippers and operate during select times only.
11. **Standardized frequency** – Frequencies should be standardized using clock-face schedules to create 30, 60 and 120 minute headways.
12. **Priority to existing ridership** – Service should be increased in areas that warrant it over servicing new areas if limited resources are available.

13. **Connections** – No route should be designed in isolation. If possible it should connect to at least one hub. Where connections to hubs are not possible the route should connect with at least one other route to facilitate transfers.
14. **Efficiency** – Where possible routes should be designed to be the most efficient. Decisions to deviate off the main corridor and add time to the route are only warranted where key destinations like shopping centers are too far off the main road, there are a lack of pedestrian facilities or the benefit (due to demand) of servicing the deviation outweighs the additional time incurred to others on the route.
15. **Consistency** – Except where warranted by peak only routes or increased peak hour service, service should have consistent headways throughout the day using clock-face schedules.
16. **Regional network** – Regional connections should be improved to provide access outside of the CATA service area through transfers with other systems such as the MBTA or commuter rail.

7.3 Recommendations Overview

Recommendations are categorized by route and phase. A three phase process was used in order to prioritize recommendations. Priority was based on demand, route performance, public feedback and resource availability. In Phase 1 alignments have been revised to provide direct service that is bidirectional and services high demand areas. Service spans have been increased to add evening service and frequencies have been standardized. In Phase 2 service frequencies have been further improved. In Phase 3 Sunday service has been added to select routes and service to Manchester by the Sea should be explored. In general Phase 1 can be implemented immediately as it does not require an increase in the current fleet size, but Phase 2 and Phase 3 can only be implemented as resources and capital equipment become available.

Phase 1:

- Standardize frequency
- Separate out school trippers as their own routes
- Extend weekday service in the evening

Phase 2:

- Improve frequency
- Streamline routes

Phase 3

- Sunday service

A summary of the overall recommendations is in Table 20 and Table 21 breaks down the recommendations by phase. Figure 57- Figure 59 are maps depicting system wide alignment changes for each phase of the plan. For detailed individual route recommendation profiles see section 7.7.

Table 20. Service Recommendations

CATA Proposed Service Recommendations				Weekday				Saturday				Sunday			
Route	Name	Proposed Changes	Alignment Changes	Existing		Proposed		Existing		Proposed		Existing		Proposed	
				Frequency	Span	Frequency	Span	Frequency	Span	Frequency	Span	Frequency	Span	Frequency	Span
Blue	Gloucester to Rockport via Lanesville	School service deviations only on select trips.	Turnaround loop in downtown Gloucester uses Manuel F. Lewis Street.	120	6:15 AM – 6:30 PM	60	6:00 AM - 9:00 PM	120	8:30 AM – 5:15 PM	120	8:00 AM - 8:00 PM			-	-
Red	Gloucester to Rockport via Thatcher Road	School service deviations only on select trips.	None recommended	120	6:15 AM – 6:45 PM	60	6:00 AM - 9:00 PM	120	10:30 AM – 4:30 PM	120	8:00 AM - 8:00 PM			-	-
Green	Gloucester to Rockport via Eastern Avenue	Add service to Gloucester Station, on-demand Blackburn Industrial Park service	Serves Rockport Station. Services Gloucester Crossing	60	7:30 AM – 5:45 PM	30	6:00 AM - 9:00 PM	60	9:30 AM – 5:00 PM	30	8:00 AM - 8:00 PM			120	10:00 AM – 6:00 PM
Yellow	Gloucester to Magnolia	Consider flex service or route discontinuation if low ridership persists	Turnaround loop in downtown Gloucester uses Washington/Railroad/Pleasant. Consolidate service along Hesperus/Norman into Magnolia.	180-300	7:00 AM – 3:45 PM	120	6:00 AM - 9:00 PM	120-180	9:00 AM – 4:15 PM	120	9:00 AM - 5:00 PM			-	-
Purple	Gloucester to West Gloucester	Run existing pattern to Essex town line for school trips only; if non-school ridership justifies continued all-day service, terminate at West Gloucester Station		300	6:00 AM – 4:15 PM	120	6:00 AM - 9:00 PM	120-180	9:00 AM – 4:45 PM	120	9:00 AM - 5:00 PM			-	-
Orange	Gloucester Crossing & Business Express Loop		Introduce bidirectional service, minimize out-of-direction travel unless warranted by demand or need to access community facilities	60	8:00 AM – 5:00 PM	30	6:00 AM - 9:00 PM	60	9:00 AM – 3:00 PM	60	8:00 AM - 8:00 PM			120	8:00 AM - 6:00 PM
Mall Shuttle	Gloucester to Danvers and Peabody	Improved Saturday frequency, introduction of Sunday service	None recommended			-	-	90-120	10:00 AM – 5:00 PM	60	10:00 AM – 6:00 PM			60	10:00 AM – 6:00 PM
City of Beverly Shuttle	City of Beverly Circulator	Cannot change service per contract with City of Beverly, but a split route with bidirectional service would better serve city's needs		60	7:45 AM – 4:45 PM	60	7:45 AM – 4:45 PM	60-120	7:00 AM – 3:15 PM	60-120	7:00 AM – 3:15 PM			-	-
Ipswich Shuttle	Ipswich Shuttle	New route				60	6AM - 9AM, PM--5PM			-	-			-	-
Rockport Shuttle	Blue Gate Meadows Parking Lot	None recommended		20	11:00 AM – 6:45 PM	20	11:00 AM – 6:45 PM	20	11:00 AM – 6:45 PM	20	11:00 AM – 6:45 PM	20	11:00 AM – 6:45 PM	20	11:00 AM – 6:45 PM
Stage Fort Trolley	Stage Fort Park to Rocky Neck	None recommended				-	-	60	10:00 AM – 5:00 PM	60	10:00 AM – 5:00 PM	60	10:00 AM – 5:00 PM	60	10:00 AM – 5:00 PM
Ipswich-Essex Explorer	Ipswich-Essex-Crane Beach	None recommended				-	-	45	10:15 AM – 5:30 PM	45	10:15 AM – 5:30 PM	45	10:15 AM – 5:30 PM	45	10:15 AM – 5:30 PM
Tripper	Western Ave	Tripper only				2 trips	6AM -8PM 1:30PM - 3:30PM			-	-			-	-
Tripper	Route 133	Tripper only				2 trips	6AM -8PM 1:30PM - 3:30PM			-	-			-	-
Pink	Lincoln Ave	New route to service Lincoln Park, the VA agent, the food pantry, the high school, the train station and McPherson housing	Main -Pleasant- Railroad -Washington - Centennial - Emerson-Lincoln - Leslie O Johnson- Centennial - Washington - Prospect- Pleasant - Duncan- Rogers			30	6:00 AM - 9:00 PM			60	8:00 AM - 8:00 PM			120	8:00 AM - 6:00 PM

Table 21. Recommendations by Phase

Bus Route	Alignment	Schedule	Phase 1	Phase 2	Phase 3
Blue - Gloucester to Rockport via Lanesville	Make turnaround loop in Gloucester smaller	-60 minute frequency -Service span 6 AM to 9 PM weekdays -Service span 8 AM to 8 PM Saturdays	-Change alignment -Extend service spans -Improve frequency 90 min	-Improve frequency 60 min	
Red - Gloucester to Rockport via Thatcher Road	No change	-60 minute frequency -Service span 6 AM to 9 PM weekdays -Service span 8 AM to 8 PM Saturdays	-Extend service spans -Improve frequency 90 min	-Improve frequency 60 min	
Green - Gloucester to Rockport via Eastern Avenue	Service to Industrial park on select trips. Service to Gloucester Crossing and Rockport train station added	-Service span 6 AM to 9 PM weekdays -Service span 8 AM to 8 PM Saturdays -Sunday service 10 AM to 6 PM -Weekday and Saturday frequency 30 min	-Change alignment -Extend service spans	-Improve frequency	-Implement Sunday service
Yellow - Gloucester to Magnolia	Consolidate service along Hesperus/Norman into Magnolia	-120 minute frequency -Service span 6 AM to 9 PM weekdays	-Change alignment -Extend weekday service spans -Improve frequency		-Extend service to Manchester by the Sea
Purple - Gloucester to West Gloucester	Terminate service at West Gloucester Station	-60 minute frequency weekday -Service span 6 AM to 9 PM weekdays -120 minute frequency weekend	-Change alignment -Extend service spans -Improve frequencies		
Orange - Gloucester Crossing & Business Express Loop	Bidirectional service, split into 2 routes	-30 minute frequency weekday -Service span 6 AM to 9 PM weekdays -Service span 8 AM to 8 PM Saturdays -Sunday service 8 AM to 6 PM	-Change alignment -Extend service spans -Improve frequency	-Split into 2 routes	-Implement Sunday service
Mall Shuttle - Gloucester to Danvers and Peabody	No change	-60 minute frequency -Service span 10 AM to 6 PM Saturdays -Service span 10 AM to 6 PM Sundays	-Extend service spans	-Improve frequency	-Implement Sunday service
City of Beverly Shuttle	Cannot change service per contract with City of Beverly, but a split route with bidirectional service would better serve city's needs	No change			
Ipswich Shuttle	New Route	-Flex route with peak hour service only, 60 minute frequency		-Implement service	
Rockport Shuttle - Blue Gate Meadows Parking Lot	No change	No change			
Stage Fort Trolley	No change	No change			
Ipswich-Essex Explorer	No change	No change			
Route 133 Tripper	Essex town line to Gloucester via the High School	2 trips daily	-Implement service		
Western Ave Tripper	Magnolia to Gloucester HS via Western Ave	2 trips daily	-Implement service		
Pink Route	New route from splitting the Orange Route into 2 routes	New route		-Implement Route	-Implement Sunday service



IPSWICH

IPSWICH

IPSWICH

ESSEX

Essex Bay





ROCKPORT

GLOUCESTER


GLOUCESTER


Gloucester Harbor

CATA Route Network Phase 1

 No service change	 Service eliminated
 Service added	 School Tripper service only

0 0.75 1.5 3

 Miles



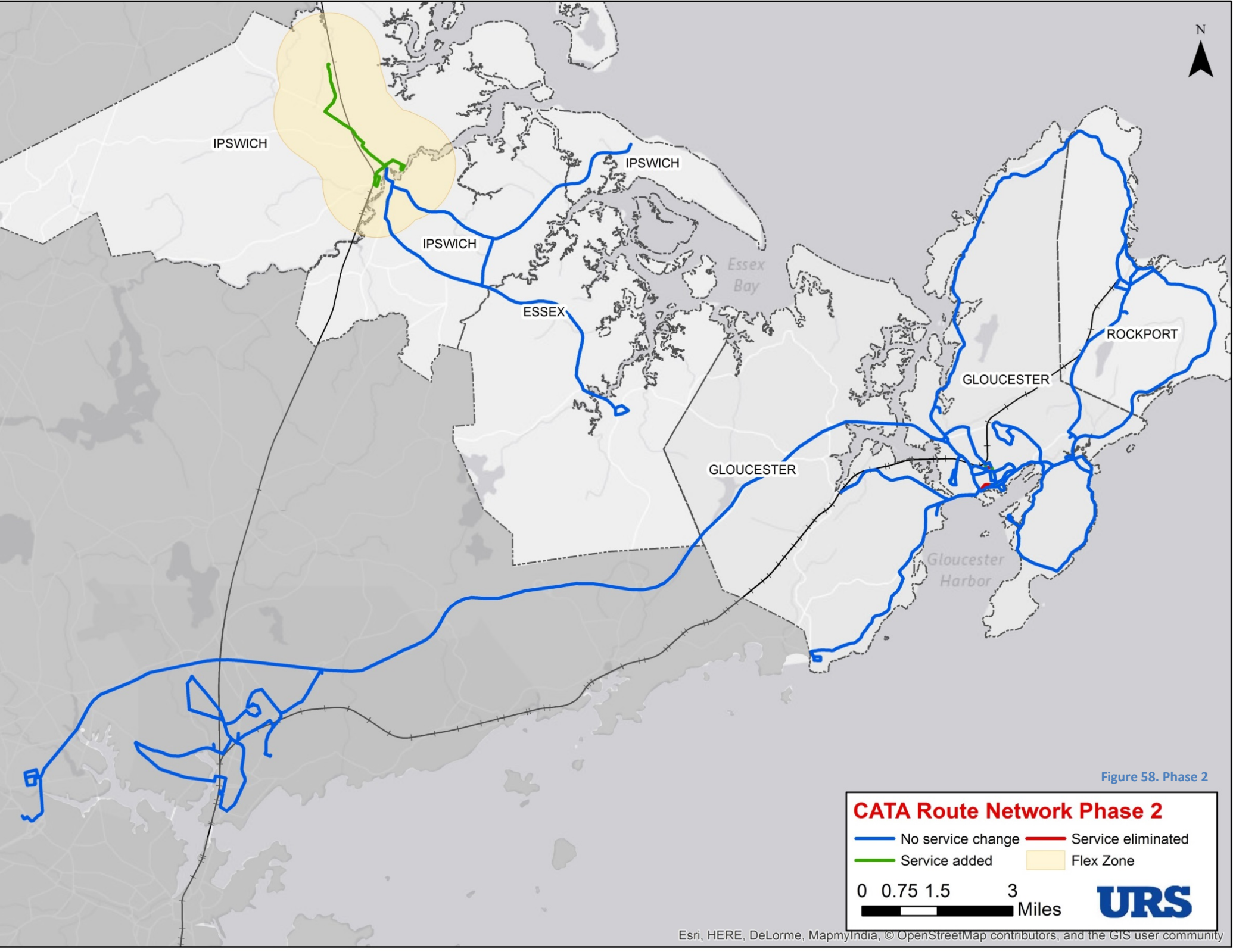


Figure 58. Phase 2

CATA Route Network Phase 2

No service change

Service added

Service eliminated

Flex Zone

00.751.53

Miles

URS

Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap contributors, and the GIS user community

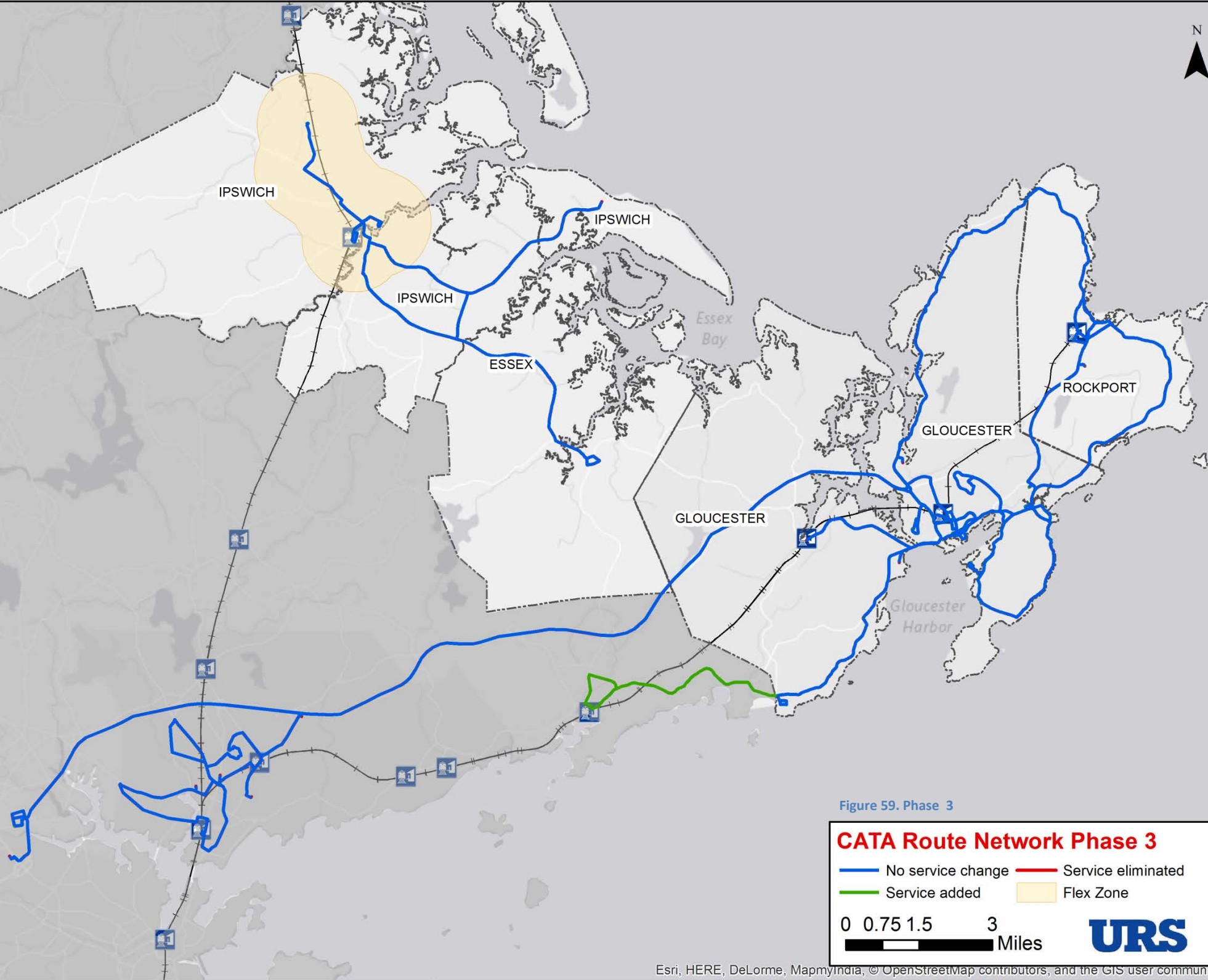






Figure 59. Phase 3

CATA Route Network Phase 3

 No service change	 Service eliminated
 Service added	 Flex Zone

0 0.75 1.5 3
Miles

URS

7.4 Cost Estimation

7.41 Operating Costs

Operating costs are based on the average cost per hour of \$160 and incorporate all of the recommendations for each route and phase. The cost can be adjusted by implementing some but not all recommendations or interlining routes to improve efficiency; therefore the final costs may differ slightly from what is proposed. Figure 60 charts the total operational cost for the existing system and the additional costs associated with the service improvements in each phase. For a breakdown of the cost/savings for each route and phase see the recommendation profiles in section 7.7.

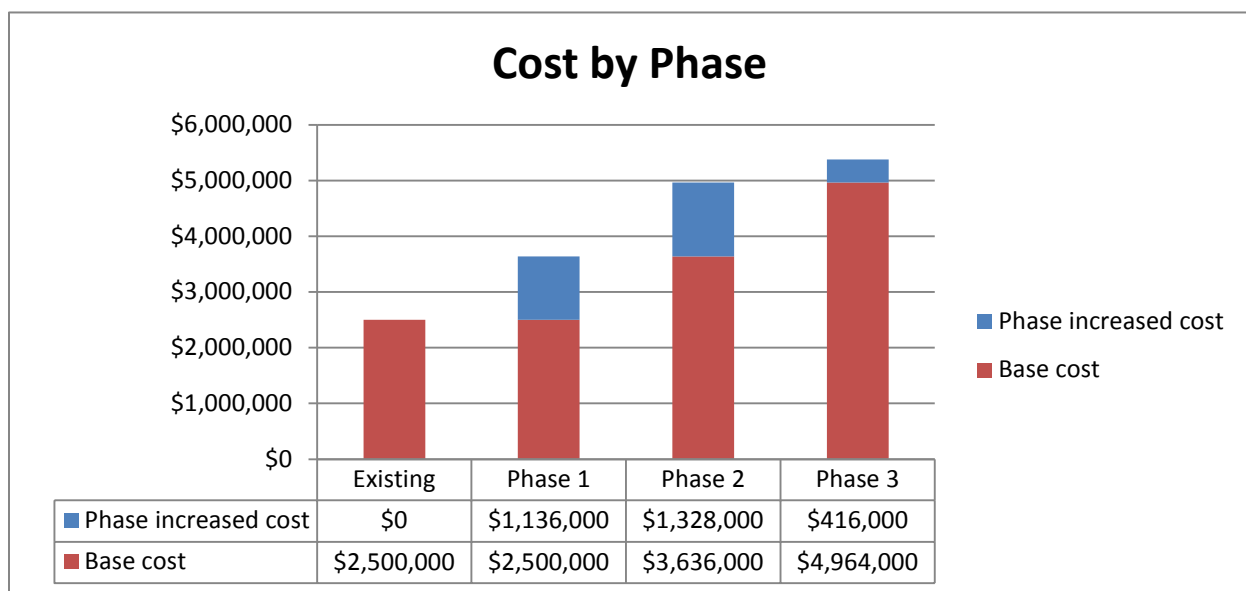


Figure 60. Cost by Phase

7.42 Capital Costs

Capital costs include vehicle and infrastructure costs. In Phase 1 the primary constraint was based on the number of vehicles required in peak service. CATA currently has a fleet of 17 buses to provide fixed route service. In peak service there are currently 8 vehicles (not including school trippers) in use; Phase 1 was designed with the fleet size as a constraint (Figure 61). Future phases will require additional vehicles, beyond the current capacity, and the procurement process can take up to two years from the time the process begins until the vehicles are delivered and put into service. CATA must begin to plan now for future expansion of the fleet.

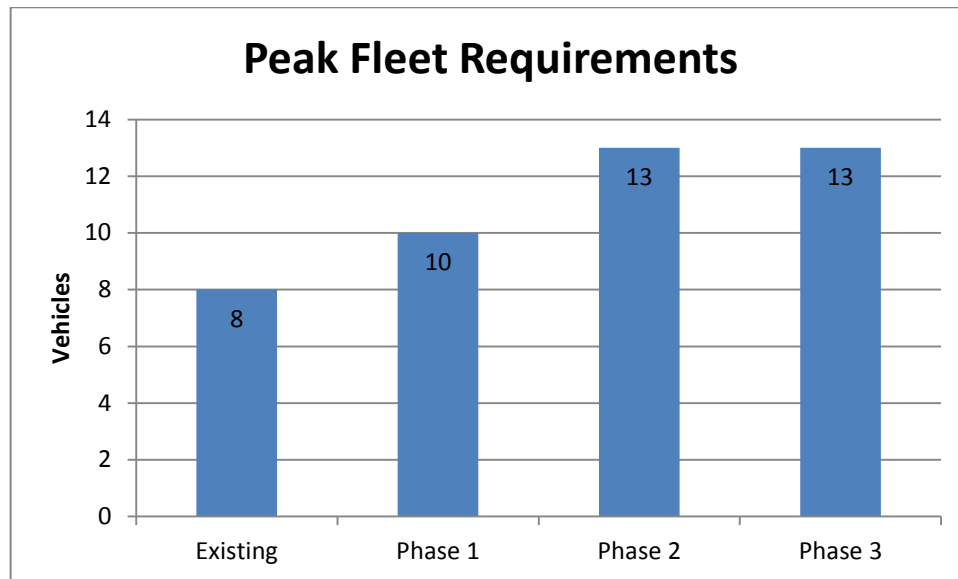


Figure 61. Fleet Requirements by Phase

It is also recommended that CATA purchase vehicle scheduling and run cutting software in order to automate and improve vehicle and driver scheduling. This will help reduce the cost per hour of service as it would be operated in a more efficient manner. Software of this nature can range in cost with features but typically can cost upwards of \$100,000. Computerized run cutting software acts as a tool and saves the scheduler time, freeing them up for other tasks, its accuracy goes unquestioned and it allows schedulers to test “what-if” alternatives quickly. In a study¹⁸ conducted by National Center for Transit Research they found that when automated scheduling software was implemented the process was faster and easier than doing it manually. This saves time, is more flexible, achieves cost savings, and reduces the need for drivers and vehicles.

7.5 Recommended Service Guidelines

In order to establish service guidelines in the pursuit of establishing a monitoring program in the future, service must first be monitored and data collected. Routes should be defined by the function they service in order to accurately measure the health of a route. Four types of routes are recommended for CATA: (1) fixed route, (2) tripper, (3) commuter, and (4) seasonal. Each route type will have in turn different performance measures to monitor existing service and evaluate new service. Table 22 provides an overview of the suggested route type and pairing for existing and recommended CATA routes.

Fixed Routes – These are routes that service densely populated areas. They typically begin and end in an urban center and stop at all locations along the way.

¹⁸ Mistretta et al (2005) Fixed Route Transit Scheduling in Florida: The State of the Industry. National Center for Transit Research, USF, Tampa Florida. <http://www.nctr.usf.edu/pdf/527-01-3.pdf>

Trippler Routes- These routes typically run twice a day and service the high school. The timing of the routes is dependent on school bell times. They operate only when school is in session and between the school and residential areas.

Commuter Routes – Commuter routes are designed to provide faster, direct service and have limited stops. They typically operate on certain days only and may have varying hours.

Seasonal Routes – Seasonal routes are designed to decrease traffic in downtown corridors by providing shuttle service between tourist destinations and parking areas.

Table 22. CATA Route Types

Route Type	Routes
Fixed	Blue, Red, Green, Yellow, Purple, Orange, Pink, Beverly
Trippler	Route 133, Western Ave
Commuter	Mall shuttle, Ipswich shuttle
Seasonal	Rockport, Stagefort, Ipswich-Essex

Categories of data to be collected and used in the monitoring program include the following, which are discussed in detail below:

- Ridership
- On-time performance
- Financial
- Service coverage
- Service levels – span and frequency

Passenger boarding data should be collected continually on a time-specific basis. There is a trade-off between data collection efforts and the value of information. It is just as easy to collect too much data as it is to collect insufficient data. Passenger boardings should be recorded daily by route, fare category, and by trip; this information can often be generated through farebox reports. One goal all transit agencies should strive to reach is the implementation of Automatic Passenger Counters (APCs). APCs include capabilities such as recording each passenger by fare category as they board. This function should be programmed into the software as it is implemented. However, even without the benefit of APCs, passenger data can still be collected and recorded by drivers for numerous variables.

With any transit system, it is important to monitor on-time performance. An on-time performance goal should be established (e.g. an attainable on-time goal of 95 percent may be considered). Minor adjustments to routes may be needed to ensure that schedule and headway adherence can be maintained. If automatic vehicle location (AVL) software is not available to track on-time performance, drivers should report actual arrival and departure times at designated bus stops along the routes and at

major stops. It should be emphasized that drivers should not leave prior to a scheduled stop time to make up time along a route. Leaving early could cause riders to miss a bus. The dispatcher should then record this information so that the number of trips running late can be determined.

Financial data are required to evaluate performance measures such as the operating cost per hour of service and the cost per passenger-trip. Financial monitoring should continue as part of the performance monitoring program. Important data to collect and report include operating revenue by source, farebox revenue by fare category, maintenance costs, gas and oil expenditures, and employee-related costs (including salary and benefits).

Service coverage should be based on demand as the area has a wide range of employment and population density. Before service is expanded to new areas or frequencies increased, density thresholds should be examined (Table 23).

Table 23. Service Thresholds

Jobs & Population per Square mile	Fixed-Route Headway
<2,000	No service
2,000-3,000	120 min or peak only
3,001-6,500	60 Min
6,501-16,000	30 Min
16,001-250,000	15 Min
250,001+	5 Min

It is also important to establish minimum levels of service for each route type. These include service span and frequency. Table 24 below outlines suggested minimum service spans (or number of trips) for each route type. Service can begin earlier or end later if demand warrants. Adjustments to the times can also be made based on the hours of centers served and the passengers needs but should be within the financial capacity of CATA.

Table 24. Minimum Service Spans

	Fixed Routes	Tripper Routes	Commuter Routes	Seasonal Routes
Weekday	6:00 AM – 9:00 PM	6:00 AM - 8:30 AM 2:00 PM – 4:00 PM	6:00 AM– 9:00 AM, 3:00 PM – 6:00 PM	Varies with need
Saturday	9:00 AM – 5:00 PM	-	6:00 AM– 9:00 AM, 3:00 PM – 6:00 PM	Varies with need
Sunday	10:00 AM – 4:00 PM	-	6:00 AM– 9:00 AM, 3:00 PM – 6:00 PM	Varies with need

Frequency often has a direct correlation with ridership; higher levels are more attractive to riders but cost more to operate; therefore it is critical to establish frequencies that are high enough to attract riders but not so high that the subsidy is greater than the need. Higher frequency routes require more vehicles and drivers. Clock-face schedules should be used except for under unique circumstances. These circumstances can include trips that are: designed to meet work shifts or school bell times; that include clock-face schedules that would require excessive recovery time (inefficient service); or that disallow interlining with other routes or miss key transfers. Minimum service frequencies are presented in Table 25 and should correlate to service thresholds established in Table 23. These frequencies represent minimums based on the service spans in Table 24 but can have variations throughout the day such as added service during the peak hours or reduced service at night.

Table 25. Minimum Frequencies

Route Type	Weekday	Saturday	Sunday
Fixed	60 Minutes	120 Minutes	120 Minutes
Tripper	2 trips/day	--	--
Commuter	60 Minutes	60 Minutes	60 Minutes
Seasonal	30 Minutes	60 Minutes	60 Minutes

7.51 New Service Warrants

CATA often receives requests for new service; new service warrants will help CATA evaluate proposals and determine service levels. Section 7.63 outlines how to monitor and measure new services. The development of the new services should follow the new service warrants and after 2 years be able to meet or exceed the performance measures outlined in Section 7.63.

When analyzing new service requests and proposals the following should be considered:

- **Area coverage** – When service is proposed the new route should be evaluated for its ability to connect to other routes, meet service thresholds, and operate cost effectively. Routes that

extend outside the service area may have a demand but the increased miles/hours may cause the subsidy to be greater than those recommended in the performance measures.

- **Transit dependent populations** – The presence of transit dependent populations should be considered when evaluating new service proposals. If there is a high but remote transit dependent population, alternative service types such as Dial-A-Ride or flex routes might be warranted.
- **Special markets** – New service is often proposed for special markets such as a new shopping center, university campus, or employment center. These markets often produce demand but the cost to service them can be high and ridership potential undetermined. CATA should work with these destinations to secure some dedicated funding which can help bring down the cost of the route.

7.6 Performance Measures

Performance measures serve as a guide to evaluate the success of a transit service. Performance measures include the types of data to be collected and give the tools necessary to identify transit system opportunities and deficiencies. Performance measures should:

- Be easily measurable
- Have a clear and intuitive meaning so that it is understandable to those who will use it and to non-transportation professionals
- Be acceptable and useful to transportation professionals
- Be comparable across time and between geographical areas
- Have a strong functional relationship to actual system operations so that once changes occur in service operations, changes to the system can readily be determined
- Provide the most cost-effective means of data collection
- Where appropriate, be based on statistically sound measurement techniques
- Be consistent with measures identified for other systems

Recommended performance measures to monitor existing and future routes could include:

- **Passengers/Hour:** Number of total monthly and annual passengers divided by the corresponding revenue-hours.
- **Subsidy/Passenger:** Total expenses minus fare revenue divided by ridership.
- **Farebox Recovery:** The percentage of operating costs covered by fares collected, calculated by the fares collected divided by the cost to operate the route.
- **Cost/Revenue-Hour:** An excellent indicator of efficiency is cost per revenue-hour of service. Costs per hour should be analyzed by route and compared to overall system averages.
- **Late Trips:** The percentage of fixed-route trips which operate late or are missed should be recorded and reported. The recommended standard for late trips is any trip that is more than five minutes behind schedule.
- **Service/Road Calls:** the number of service/road calls divided by the number of revenue miles. This measure is typically measured for the entire system and not individual routes. This monitors routine maintenance and vehicle performance.

- **Accidents/100,000 miles:** Measure of driver safety. There must be a standard practice for defining what an accident is.

7.61 Service Benchmarks

The aforementioned performance measures can be used to create benchmarks for service operation. The benchmarks will help CATA track progress and set goals for the performance of the route. These benchmarks should be seen as short-term goals that should be re-evaluated at set intervals—at least every five years—to ensure that the expectations for the route are consistently evolving. If a specific benchmark has been greatly exceeded during the first two years of operation, the criteria should be changed to provide a progressive target for the service. The following benchmarks were determined by the base type of service, national best standards and the current performance.

Passengers per Hour

Passengers per hour measures ridership as a function of the amount of service provided and will vary based on the type of route. Table 26 outlines the threshold for route/service types which can be used to monitor the route. As system-wide service improves these values should be adjusted to reflect the change and reevaluated every 3-5 years. They are based on current performance and best practices. If routes are performing at 75% or below of the benchmark then the route may need to be evaluated to determine remedies to improve performance.

Table 26. Passenger per Hour

Route Type	Passengers per Hour
Fixed	10
Tripper	12
Commuter	10 per trip
Seasonal	5

Subsidy per Passenger

Subsidy per passenger measures the cost of providing service, taking into account fare revenue collected. As with passengers per hour, as system-wide service improves these values should be adjusted to reflect improvements and should be reevaluated every 3-5 years. CATA should strive to have a subsidy per passenger less than **\$8** on all routes. If subsidies are more than 50% higher than the benchmark and the route does not have a dedicated source of funding, then the route may need to be evaluated to determine remedies to improve performance.

Farebox Recovery

Long term CATA should strive to achieve a 20% farebox recovery ratio. To achieve this goal CATA should set an intermediate goal of a recovery ratio of **15%** on all routes for the next five years. If the ratio drops on a route to below 8% then the route may need to be evaluated to determine remedies to improve performance.

Cost per Revenue Hour

Cost per revenue hour by route should be related to the average of the system so that it can change as service is added or subtracted or funding sources change. Table 27 provides a guideline for monitoring this benchmark.

Table 27. Cost per Hour Performance Standard Criteria

Performance	Percentage of Average	Action
Very Low	0%-50%	Immediate action
Low	51%- 75%	Subject to review
Average	75%-150%	No action needed
High	150%+	Evaluate for service improvements

For those routes performing under 50% immediate actions are listed in section 7.62. Routes falling within the 50%-75% range are routes that are candidates for monitoring service. Routes falling within the 75%-150% range are routes that are performing well and require no action. 150%+ routes indicate high performing routes which may benefit from increased service.

Late Trips

Late trips measure on-time performance and help evaluate a vehicle's adherence to a schedule. A trip is considered on-time if it departs a timepoint no more than five minutes late; no trips should leave early. The recommended best practice for on-time performance nationwide is **95%**; CATA should strive to meet this benchmark.

Service/Road Calls

Vehicle breakdowns are inevitable. This measure tracks the distance traveled between mechanical breakdowns. Although frequent occurrences can create disruptions in a transit system, it is important to track the frequency and type of mechanical failures of each vehicle in addition to monitoring a fleet's age. Monitoring of vehicle breakdowns is one method of reducing system disruptions and may allow an agency to improve monitoring of vehicle replacement schedules and preventative maintenance practices. Data collection efforts should include date, time of day, type of failure, age of vehicle, vehicle number, vehicle mileage, and how the situation was rectified. Monitoring of these items will allow CATA to recognize patterns in repeated types of mechanical breakdowns; breakdowns related to vehicle type, age or mileage; and assist with preventative maintenance programs. Wheelchair lift failures should also be monitored. CATA should strive for **20,000 miles** between road calls.

Accidents per 100,000 Miles

The FTA suggests that at a minimum transit providers strive towards the goal of six accidents or less per 100,000 miles. CATA should seek to exceed that minimum with no more than **three (3) accidents per 100,000 miles**. The measure can be calculated by dividing the number miles by the number of accidents in a given time period. Values lower than 33,333 indicate that the indicator is not being met.

7.62 Action for Low Performing Routes

If routes are not meeting at least two out of the three main indicators (passenger per hour, subsidy per passenger, farebox recovery) or fall below the minimum suggested values (8% farebox recovery, \$12 subsidy per passenger, 75% of the passenger per hour by service type or “very low” performance score for cost per hour), they should be evaluated for possible modification. The following actions may help improve route performance:

Change service level – Some low performing routes may not warrant increased service frequency; yet routes with very few trips may not attract riders. High frequency routes that are low performing should be evaluated for service changes. Low frequency routes can be evaluated for trip additions to determine if the low performance is related to minimal service. This analysis should be done in conjunction with outreach to determine if extra trips would garner higher ridership

Segment identification – A segment level analysis of a route might highlight a portion of the route that causes the overall poor performance. This segment can be modified to help improve the overall route.

Marketing – Marketing can help raise the public awareness of a route. Ridership can be poor because the public lacks knowledge of the service. A marketing/educational campaign can help improve performance statistics.

Public outreach – On-board surveys or rider interviews can help gain information about how the route can be improved.

Span identification – Evaluating the performance at different time periods throughout the day may help identify time periods or trips that garner very little ridership. For example the last trip of the day may have very low productivity and bring down the performance of the entire route.

Subsidy reduction – If the subsidy per passenger is high one way to reduce it is to explore cost sharing partnerships with external funding sources. Examples include schools/colleges, large housing complexes, shopping centers, and places of employment. Another method is to work with local employment centers to coordinate the sale of passes with employee incentives.

Discontinuation – Discontinuation is the last option for dealing with a low-performing route and should only be implemented once other measures have been tried but the route is still under performing. A whole route or segment can be discontinued. Routes should not be discontinued until other remedial actions have been tried and the service has been monitored for at least sixth months and there is still no improvement on the route.

7.63 New Service Performance Evaluation

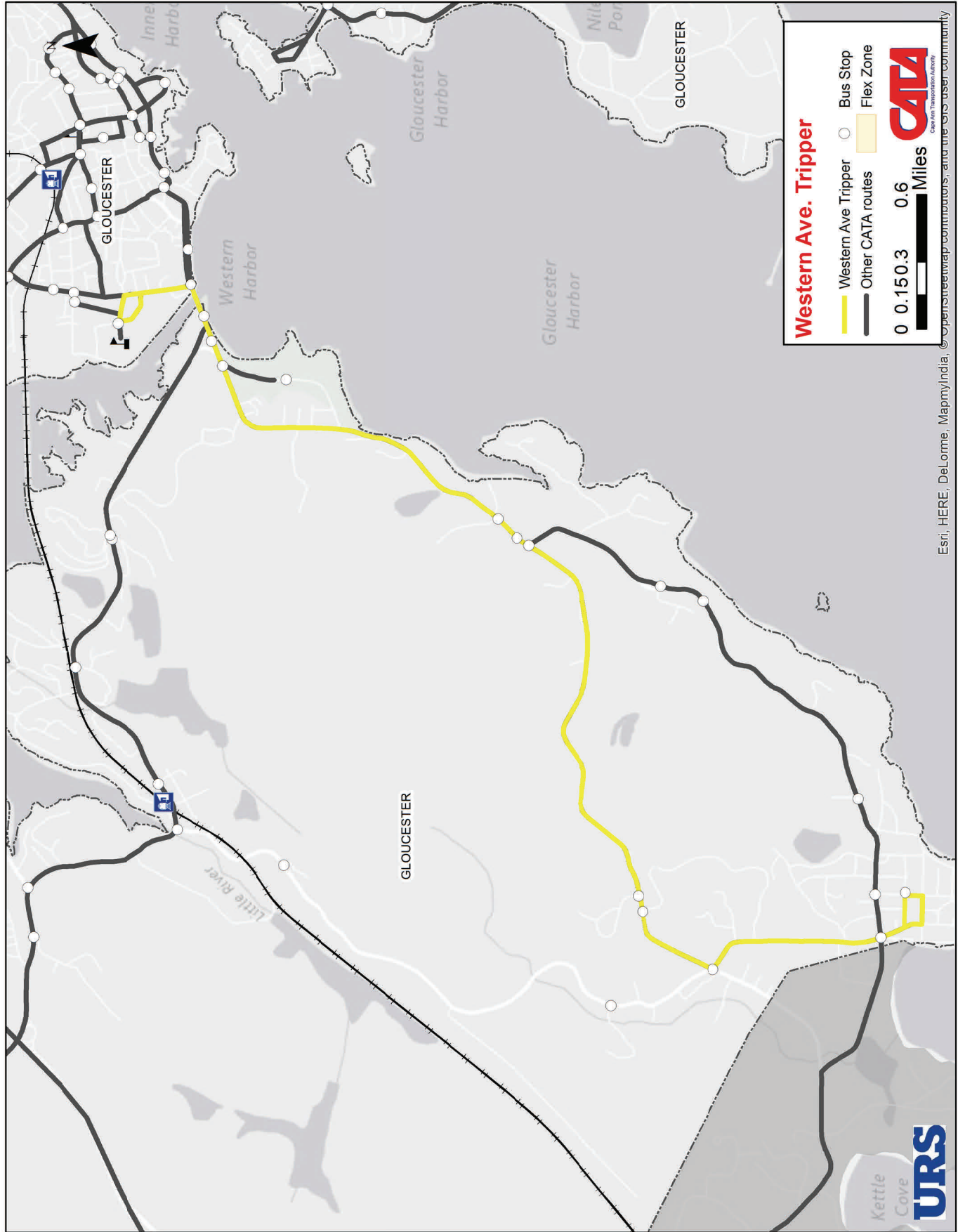
Once a new route or service has been implemented, it should be monitored for an initial period to evaluate its performance. At the onset the route may not meet the benchmarks set forth for existing

routes, but as the service becomes more popular it may. New services should be implemented for a period of at least one year in order to garner ridership and monitor monthly fluctuations. While minor changes such as timing can be made to the route within the initial period, large changes should be avoided. On-time data should be checked randomly to ensure that performance remains acceptable; a new service that has low on-time performance will have a difficult time attracting ridership. Approximately halfway through the initial period (6 months) a passenger survey of the route should be conducted to understand the effectiveness of the route. The route should continue to be monitored as a 'new route' beyond one year if ridership has had continual growth. Once ridership has plateaued the route can be evaluated against the aforementioned benchmarks with the other routes.

7.7 Recommendation Profiles

The following route profiles depict the proposed recommendation changes.

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Current Route Performance

Productivity	Western Ave	System Average
Daily Weekday Ridership	21	76
Saturday Ridership	12	89
Sunday Ridership	N/A	210
Weekday Passengers/Hr	8.1	11
Saturday Passengers/Hr	9.4	13.56
Sunday Passengers/Hr	N/A	18.40

Financials	Western Ave	System Average
Farebox Recovery	4%	7.9%
Weekday Subsidy per passenger	\$19.15	\$13.64
Saturday Subsidy per passenger	\$15.88	\$10.28
Sunday Subsidy per passenger	N/A	\$6.97

Route Type: Fixed Route

Route Ranking: 7/8 weekday, 8/11 Saturday

Proposed Service Changes

	Current	Proposed
Days Operated	Mon-Sat	Mon-Fri
Route Length	9.6 mile	8.9 mile
Route Run—Time	25-65 min	25 min
Weekday Headway	180-300 min	2 trips daily
Saturday Headway	120-180 min	N/A
Sunday Headway	N/A	N/A
Hours of Operations M-F	7:00 AM—3:45 PM	2 trips timed to school bell schedule
Hours of Operation Saturday	9:00 AM—4:15 PM	N/A
Hours of Operation Sunday	N/A	N/A

Route Alignment Changes:

With the consolidation of service on the Yellow Route along Hesperus/Norman that route will no longer serve Western Ave. To replace the lost service on Western Ave. a school tripper route has been established, which will run between Magnolia and the High School via Western Ave. This route will only run when school is in session and there will be two trips daily.

Environmental Justice Policy:

Analysis unknown

Phase 1:

-Implement service

Phase 2:

-No change

Phase 3:

-No change

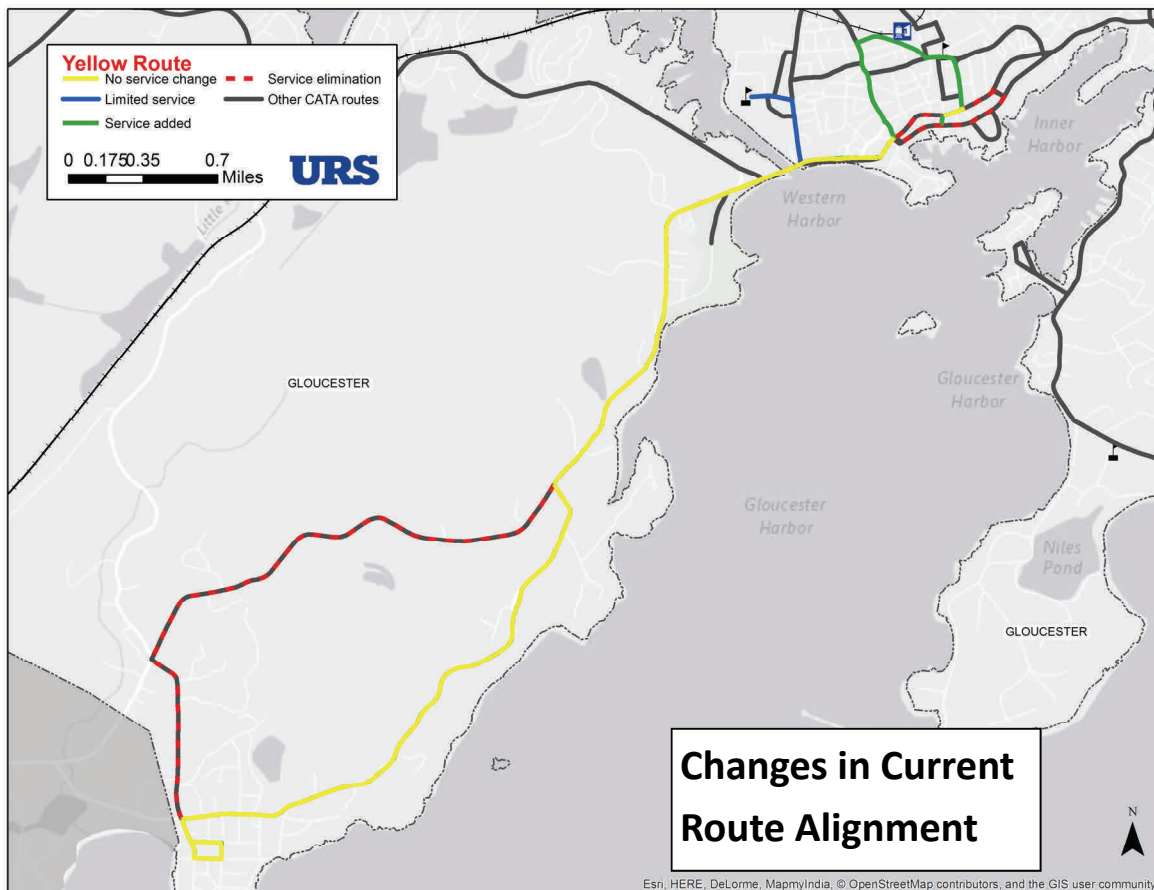
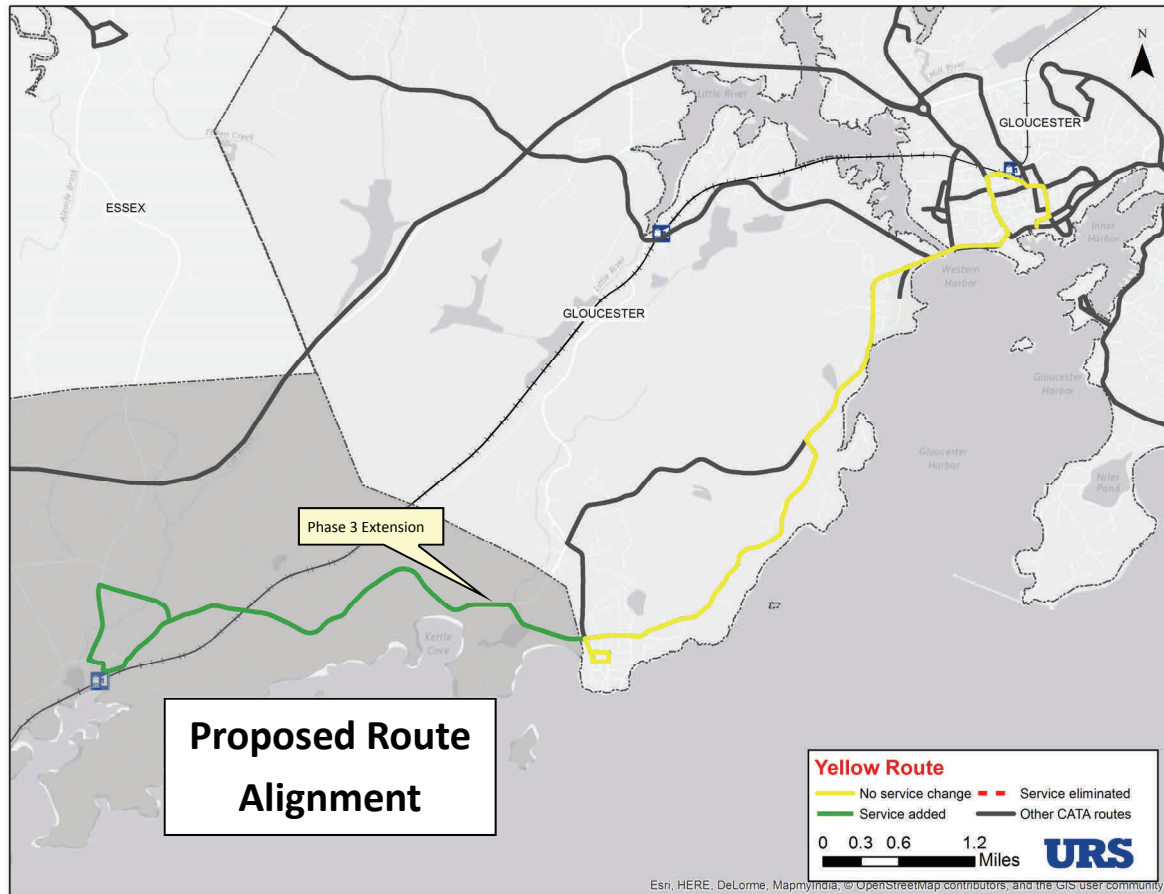
ADA Impact:

No impact, as the area is already covered by ADA service.

Financial	Phase 1	Phase 2	Phase 3
Annual Change in Revenue Hours	+210	0	0
Annual Change in Revenue Miles	+2.979	0	0
Estimate Change in Cost	+\$34,000	\$0	\$0
Additional vehicle requirements:	1	0	0
Capital Requirement: Other	None		

Other Notes:

The two trips daily will be timed to the school bell schedule.



Current Route Performance

Productivity	Yellow	System Average
Daily Weekday Ridership	21	76
Saturday Ridership	12	89
Sunday Ridership	N/A	210
Weekday Passengers/Hr	8.1	11
Saturday Passengers/Hr	9.4	13.56
Sunday Passengers/Hr	N/A	18.40

Financials	Yellow	System Average
Farebox Recovery	4%	7.9%
Weekday Subsidy per passenger	\$19.15	\$13.64
Saturday Subsidy per passenger	\$15.88	\$10.28
Sunday Subsidy per passenger	N/A	\$6.97

Route Type: Fixed Route

Route Ranking: 7/8 weekday, 8/11 Saturday

Proposed Service Changes

	Current	Proposed
Days Operated	Mon-Sat	Mon-Sat
Route Length	9.6 mile	9.5 mile
Route Run—Time	25-65 min	40 min
Weekday Headway	180-300 min	120 min
Saturday Headway	120-180 min	120 min
Sunday Headway	N/A	N/A
Hours of Operations M-F	7:00 AM—3:45 PM	6:00 AM—9:00 PM
Hours of Operation Saturday	9:00 AM—4:15 PM	9:00 AM —5:00 PM
Hours of Operation Sunday	N/A	N/A

Route Alignment Changes:

Service has been consolidated along Hesperus/Norman and removed from Western Ave. This route will now service the train station in Gloucester. The high school will be serviced on select trips. In Phase 3 service may be extended to Manchester by the Sea.

Environmental Justice Policy:

Analysis unknown

Phase 1:

- Change Alignment
- Extend service spans
- Improve frequency

Phase 2:

- No change

Phase 3:

- Extend service to Manchester by the Sea

ADA Impact:

There will be a moderate impact on ADA service. Service will have to run additional hours into the evening and service to Manchester by the Sea must be added.

Financial	Phase 1	Phase 2	Phase 3
Annual Change in Revenue Hours	+736	0	+1,412
Annual Change in Revenue Miles	+8,777	0	+19,991
Estimate Change in Cost	+\$118,000	\$0	+\$226,000
Additional vehicle requirements:	0	0	0
Capital Requirement: Other	None		

Other Notes:

Expanding service into the weekday evening will allow for connections with all PM peak commuter rail trains. This route will be interlined with the Purple Route.



Current Route Performance

Productivity	Red	System Average
Daily Weekday Ridership	66	76
Saturday Ridership	25	89
Sunday Ridership	N/A	210
Weekday Passengers/Hr	9.3	11
Saturday Passengers/Hr	7.1	13.56
Sunday Passengers/Hr	N/A	18.40

Financials	Red	System Average
Farebox Recovery	5%	7.9%
Weekday Subsidy per passenger	\$16.24	\$13.64
Saturday Subsidy per passenger	\$21.66	\$10.28
Sunday Subsidy per passenger	N/A	\$6.97

Route Type: Fixed Route

Route Ranking: 4/8 weekday, 9/11 Saturday

Proposed Service Changes

	Current	Proposed
Days Operated	Mon-Sat	Mon-Sat
Route Length	22.3 miles	22.3 miles
Route Run—Time	72 min	90 min
Weekday Headway	120 min	60 min
Saturday Headway	120	120 min
Sunday Headway	N/A	N/A
Hours of Operations M-F	6:15 AM — 6:45 PM	6:00 AM — 9:00 PM
Hours of Operation Saturday	10:30 AM—4:30 PM	8:00 AM — 8:00 PM
Hours of Operation Sunday	N/A	N/A

Route Alignment Changes:

There are no alignment changes.

Environmental Justice Policy:

Analysis unknown

Phase 1:

- Extend service spans
- Improve weekday frequency to every 90 min
- Improve Saturday frequency

Phase 2:

- Improve weekday frequency 60 min

Phase 3:

- No changes

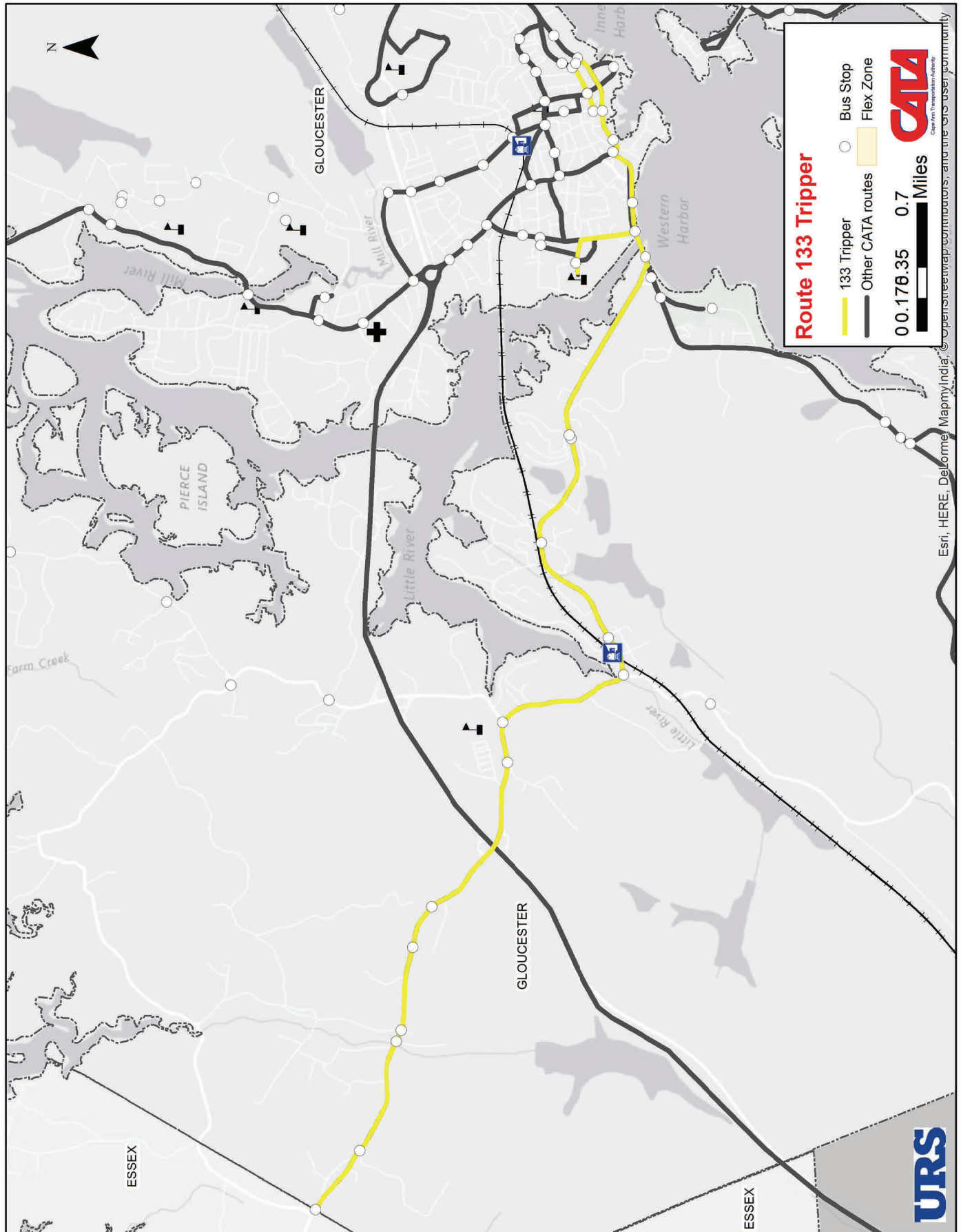
ADA Impact:

There will be a minimal impact on ADA service. Service will have to run additional hours into the evening.

Financial	Phase 1	Phase 2	Phase 3
Annual Change in Revenue Hours	+1,237	+1,436	0
Annual Change in Revenue Miles	+24,084	+28,433	0
Estimate Change in Cost	+\$198,000	+\$230,000	\$0
Additional vehicle requirements:	0	0	0
Capital Requirement: Other	None		

Other Notes:

Expanding service into the weekday evening will allow for connections with all PM peak commuter rail trains. On select trips (one in the AM and one in the PM) the route will service the High School instead of the train station.



Current Route Performance

Productivity	133 Tripper	System Average
Daily Weekday Ridership	24	76
Saturday Ridership	11	89
Sunday Ridership	N/A	210
Weekday Passengers/Hr	7.6	11
Saturday Passengers/Hr	4.5	13.56
Sunday Passengers/Hr	N/A	18.40

Financials	133 Tripper	System Average
Farebox Recovery	3%	7.9%
Weekday Subsidy per passenger	\$20.49	\$13.64
Saturday Subsidy per passenger	\$34.50	\$10.28
Sunday Subsidy per passenger	N/A	\$6.97

Route Type: Fixed Route

Route Ranking: 8/8 weekday, 11/11 Saturday

Proposed Service Changes

	Current	Proposed
Days Operated	Mon-Sat	Mon-Fri
Route Length	11.2 mile	11.2 mile
Route Run—Time	30 min	30 min
Weekday Headway	300 min	2 trips daily
Saturday Headway	120-180 min	N/A
Sunday Headway	N/A	N/A
Hours of Operations M-F	6:00 AM—4:15 PM	2 trips timed to school
Hours of Operation Saturday	9:00 AM—4:45 PM	N/A
Hours of Operation Sunday	N/A	N/A

Route Alignment Changes:

To replace the lost service on the Purple route beyond the West Gloucester Train Station a school tripper has been established, which will run between Essex town line and the High School. This route will only run when school is in session and there will be two trips daily.

Environmental Justice Policy:

Analysis unknown

Phase 1:

-Implement route

Phase 2:

-No change

Phase 3:

-No change

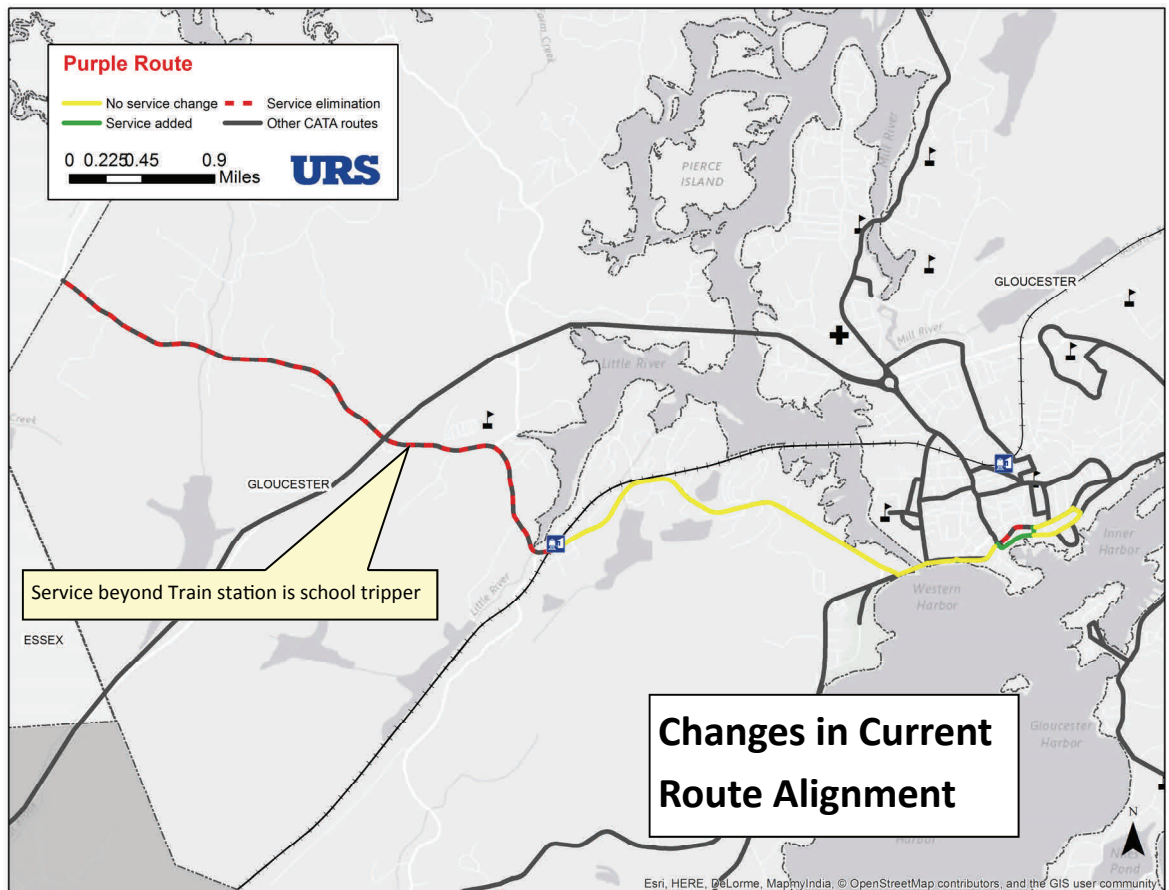
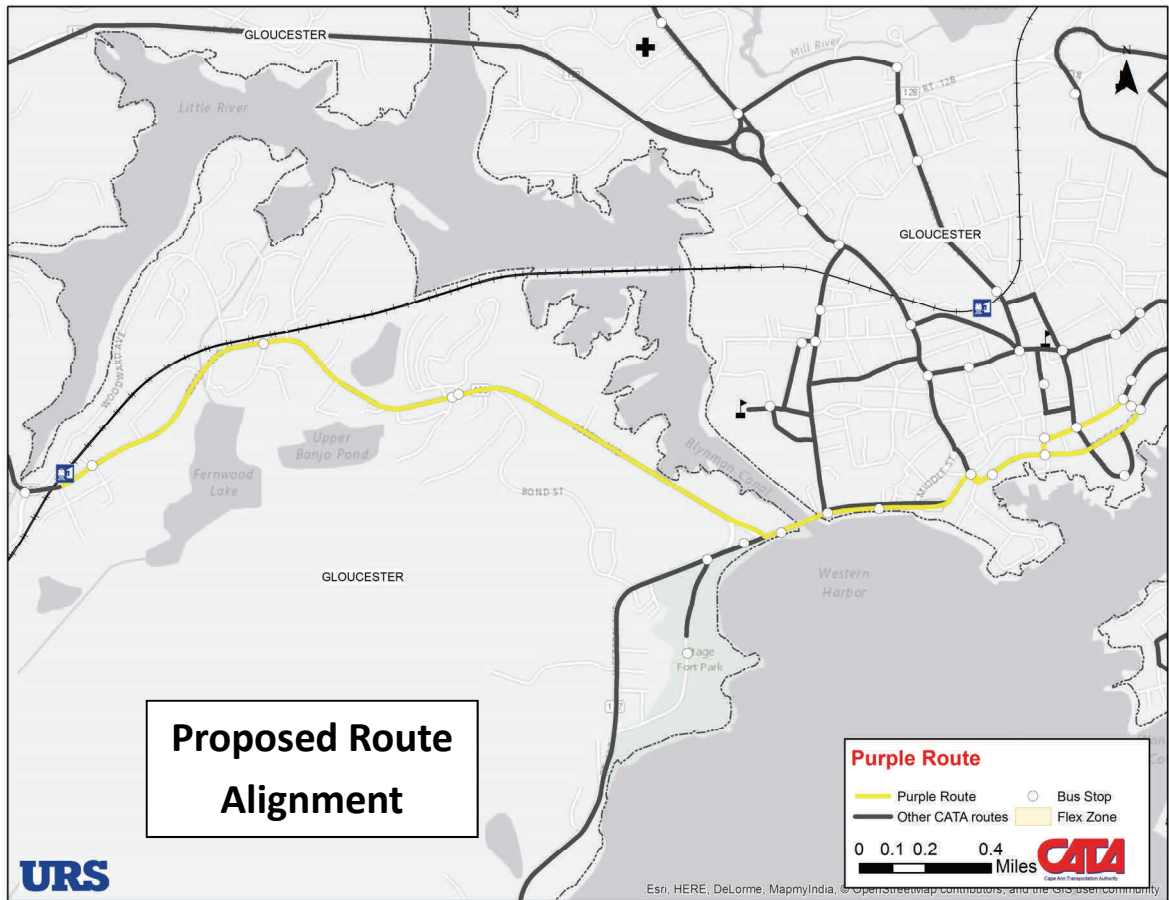
ADA Impact:

No impact, the area is already covered by ADA service.

Financial	Phase 1	Phase 2	Phase 3
Annual Change in Revenue Hours	+173	0	0
Annual Change in Revenue Miles	+3,770	0	0
Estimate Change in Cost	+\$28,000	\$0	\$0
Additional vehicle requirements:	1	0	0
Capital Requirement: Other	None		

Other Notes:

The two trips daily will be timed to the school bell schedule.



Current Route Performance

Productivity	Purple	System Average
Daily Weekday Ridership	24	76
Saturday Ridership	11	89
Sunday Ridership	N/A	210
Weekday Passengers/Hr	7.6	11
Saturday Passengers/Hr	4.5	13.56
Sunday Passengers/Hr	N/A	18.40

Financials	Purple	System Average
Farebox Recovery	3%	7.9%
Weekday Subsidy per passenger	\$20.49	\$13.64
Saturday Subsidy per passenger	\$34.50	\$10.28
Sunday Subsidy per passenger	N/A	\$6.97

Route Type: Fixed Route

Route Ranking: 8/8 weekday, 11/11 Saturday

Proposed Service Changes

	Current	Proposed
Days Operated	Mon-Sat	Mon-Sat
Route Length	11.2 mile	5.6 mile
Route Run—Time	30 min	20 min
Weekday Headway	300 min	120 min
Saturday Headway	120-180 min	120 min
Sunday Headway	N/A	N/A
Hours of Operations M-F	6:00 AM—4:15 PM	6:00 AM—9:00 PM
Hours of Operation Saturday	9:00 AM—4:45 PM	9:00 AM—5:00 PM
Hours of Operation Sunday	N/A	N/A

Route Alignment Changes:

Service will terminate at the West Gloucester train station.

Environmental Justice Policy:

Analysis unknown

Phase 1:

- Change alignment
- Expand service hours
- Improve frequencies

Phase 2:

- No change

Phase 3:

- No change

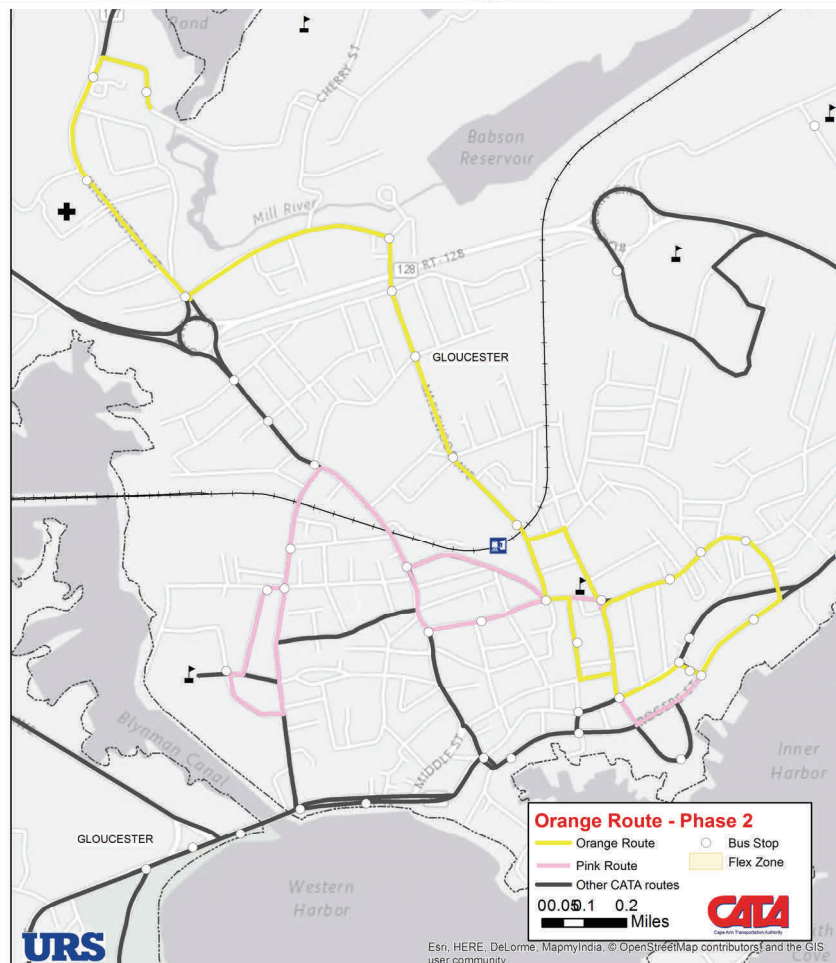
ADA Impact:

Minimal impact, the area is already covered by ADA service but service will need to be extended into the evening.

Financial	Phase 1	Phase 2	Phase 3
Annual Change in Revenue Hours	-211	0	0
Annual Change in Revenue Miles	-8,112	0	0
Estimate Change in Cost	-\$34,000	\$0	\$0
Additional vehicle requirements:	-1	0	0
Capital Requirement: Other	None		

Other Notes:

A consistent more frequent headway will help improve service. Expanding service into the weekday evening will allow for connections with PM peak commuter rail trains.



Current Route Performance

Productivity	Pink	System Average
Daily Weekday Ridership	N/A	76
Saturday Ridership	N/A	89
Sunday Ridership	N/A	210
Weekday Passengers/Hr	N/A	11
Saturday Passengers/Hr	N/A	13.56
Sunday Passengers/Hr	N/A	18.40

Financials	Pink	System Average
Farebox Recovery	N/A	7.9%
Weekday Subsidy per passenger	N/A	\$13.64
Saturday Subsidy per passenger	N/A	\$10.28
Sunday Subsidy per passenger	N/A	\$6.97

Route Type: Fixed Route

Route Ranking: N/A/8 weekday, N/A/11 Saturday

Proposed Service Changes

	Current	Proposed
Days Operated	N/A	Mon-Sun
Route Length	N/A	3.0 mile
Route Run—Time	N/A	30 min
Weekday Headway	N/A	30 min
Saturday Headway	N/A	60 min
Sunday Headway	N/A	120 min
Hours of Operations M-F	N/A	6:00 AM—9:00 PM
Hours of Operation Saturday	N/A	8:00 AM—8:00 PM
Hours of Operation Sunday	N/A	8:00 AM—6:00 PM

Route Alignment Changes:

The Pink route would service Lincoln Park, the VA agent, the food pantry, the high school, the train station and McPherson housing.

Environmental Justice Policy:

Analysis unknown

Phase 1:

-No change

Phase 2:

-Implement route

Phase 3:

-Sunday service

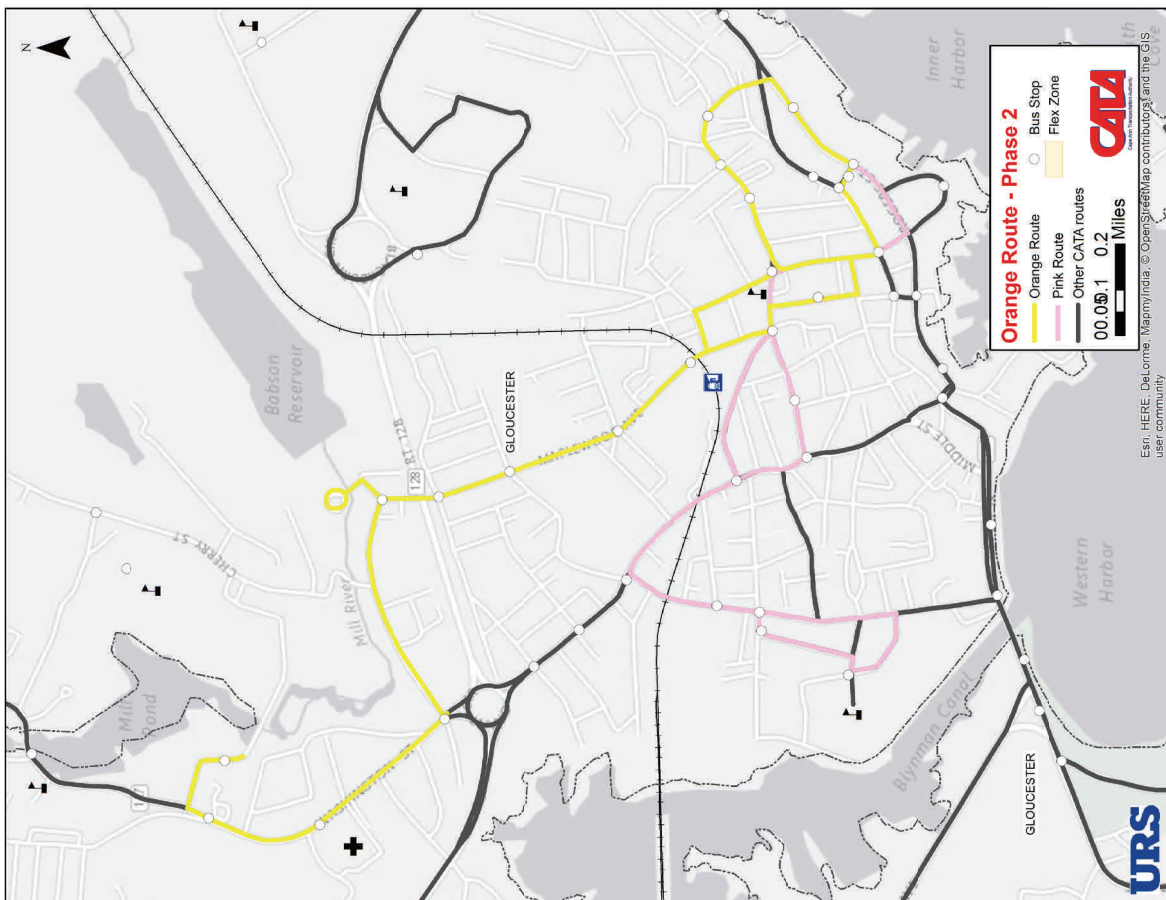
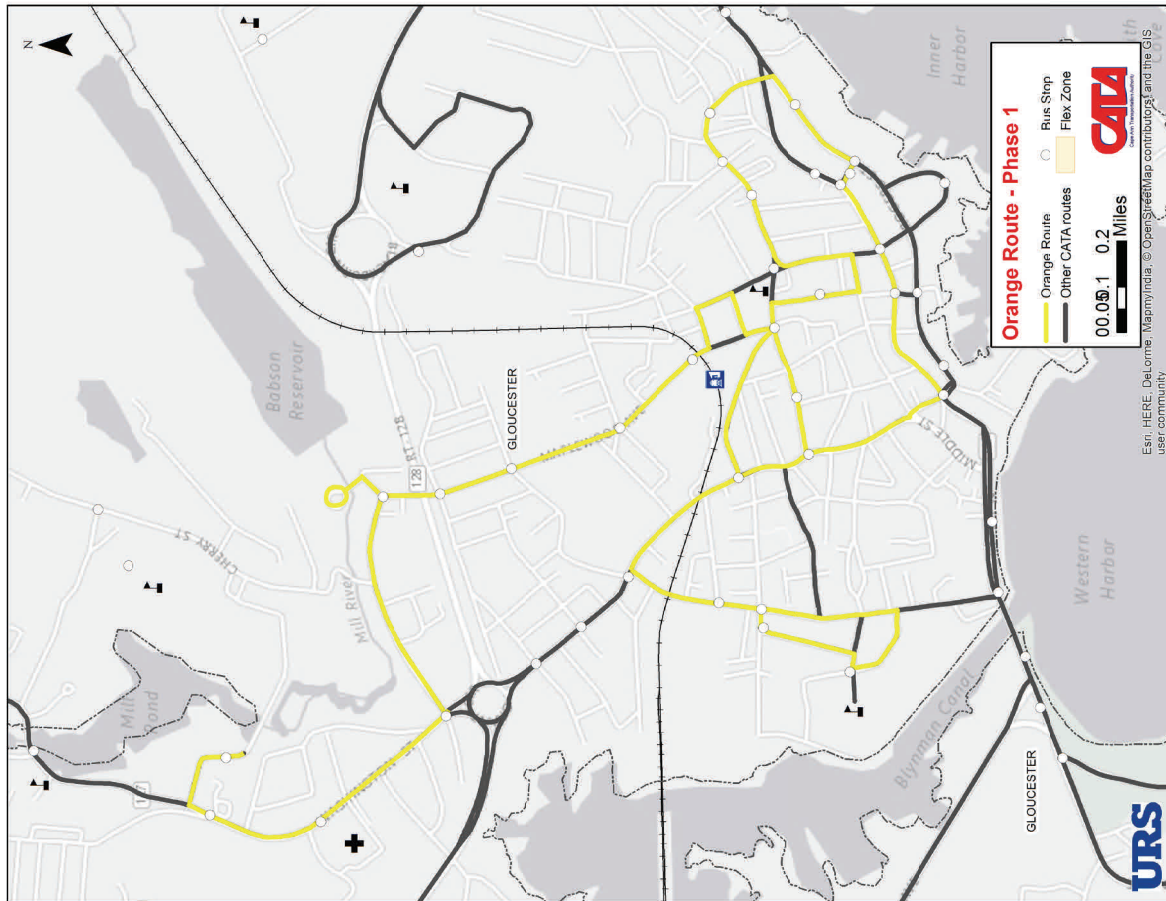
Financial	Phase 1	Phase 2	Phase 3
Annual Change in Revenue Hours	0	+2,096	68
Annual Change in Revenue Miles	0	+27,814	876
Estimate Change in Cost	\$0	+\$335,000	+\$11,000
Additional vehicle requirements:	0	1	0
Capital Requirement: Other	None		

Other Notes:

Expanding service hours will allow for connections with peak period commuter rail trains and evening shopping trips. This route will be interlined with the Green route on half the trips to provide a one seat ride from the numerous housing areas on the Pink route and shopping areas on the Green route. When the Pink route is established it will be interlined with the Orange Route on half the trips.

ADA Impact:

Large impact, the area is already covered by ADA service but service hours would need to be expanded and Sunday service added.



Current Route Performance

Productivity	Orange	System Average
Daily Weekday Ridership	186	76
Saturday Ridership	54	89
Sunday Ridership	N/A	210
Weekday Passengers/Hr	19.1	11
Saturday Passengers/Hr	9.3	13.56
Sunday Passengers/Hr	N/A	18.40

Financials	Orange	System Average
Farebox Recovery	11%	7.9%
Weekday Subsidy per passenger	\$7.45	\$13.64
Saturday Subsidy per passenger	\$16.11	\$10.28
Sunday Subsidy per passenger	N/A	\$6.97

Route Type: Fixed Route

Route Ranking: 1/8 weekday, 5/11 Saturday

Proposed Service Changes

	Current	Proposed
Days Operated	Mon-Sat	Mon-Sun
Route Length	9.5 miles	8.5 mile P1, 4.9 mile P2
Route Run—Time	45 min	45 min P1, 25 min P2
Weekday Headway	60 min	30 min
Saturday Headway	60 min	60 min
Sunday Headway	N/A	120 min
Hours of Operations M-F	8:00 AM—5:00 PM	6:00 AM—9:00 PM
Hours of Operation Saturday	9:00 AM—3:00 PM	8:00 AM—8:00 PM
Hours of Operation Sunday	N/A	8:00 AM—6:00 PM

Route Alignment Changes:

In Phase 1 Washington St, Blackburn Park and Gloucester Crossing are removed from this route. Gloucester Crossing will be on the Green Route. In Phase 2 this route would be split into two routes. The Orange route would service Mill Pond Medical, Addison Gilbert Hospital, Poplar Park housing, Sheedy Park, Dale Ave, and Curtis Clark/ Armory senior housing.

Environmental Justice Policy:

Analysis unknown

Phase 1:

- Change alignment
- Expand service hours
- Improve frequencies

Phase 2:

- Split into two routes

Phase 3:

- Sunday service

ADA Impact:

Large impact, the area is already covered by ADA service but service hours would need to be expanded and Sunday service added.

Financial

	Phase 1	Phase 2	Phase 3
Annual Change in Revenue Hours	+2,510	-2,260	+138
Annual Change in Revenue Miles	+33,273	-29,939	+1,804
Estimate Change in Cost	+\$401,000	-\$362,000	+\$22,000
Additional vehicle requirements:	1	-1	0
Capital Requirement: Other	None		

Other Notes:

Expanding service hours will allow for connections with peak period commuter rail trains and evening shopping trips. This route will be interlined with the Green route on half the trips to provide a one seat ride from the numerous housing areas on the Orange route and shopping areas on the Green route. When the Pink route is established it will be interlined with the Orange route on half the trips.



Current Route Performance

Productivity	Mall	System Average
Daily Weekday Ridership	N/A	76
Saturday Ridership	91	89
Sunday Ridership	N/A	210
Weekday Passengers/Hr	N/A	11
Saturday Passengers/Hr	14.2	13.56
Sunday Passengers/Hr	N/A	18.40

Financials	Mall	System Average
Farebox Recovery	N/A	7.9%
Weekday Subsidy per passenger	N/A	\$13.64
Saturday Subsidy per passenger	\$8.81	\$10.28
Sunday Subsidy per passenger	N/A	\$6.97

Route Type: Commuter Route

Route Ranking: N/A/8 weekday, 3/11 Saturday

Proposed Service Changes

	Current	Proposed
Days Operated	Sat	Sat-Sun
Route Length	37.1 mile	37.1 mile
Route Run—Time	90 min	90 min
Weekday Headway	N/A	N/A
Saturday Headway	90 min-120 min	60 min
Sunday Headway	N/A	60 min
Hours of Operations M-F	N/A	N/A
Hours of Operation Saturday	10:00 AM—5:00 PM	10:00 AM—6:00 PM
Hours of Operation Sunday	N/A	10:00 AM—6:00 PM

Route Alignment Changes:

No changes.

Environmental Justice Policy:

Analysis unknown

Phase 1:

-Extend service hours

Phase 2:

-Improve frequency

Phase 3:

-Implement Sunday service

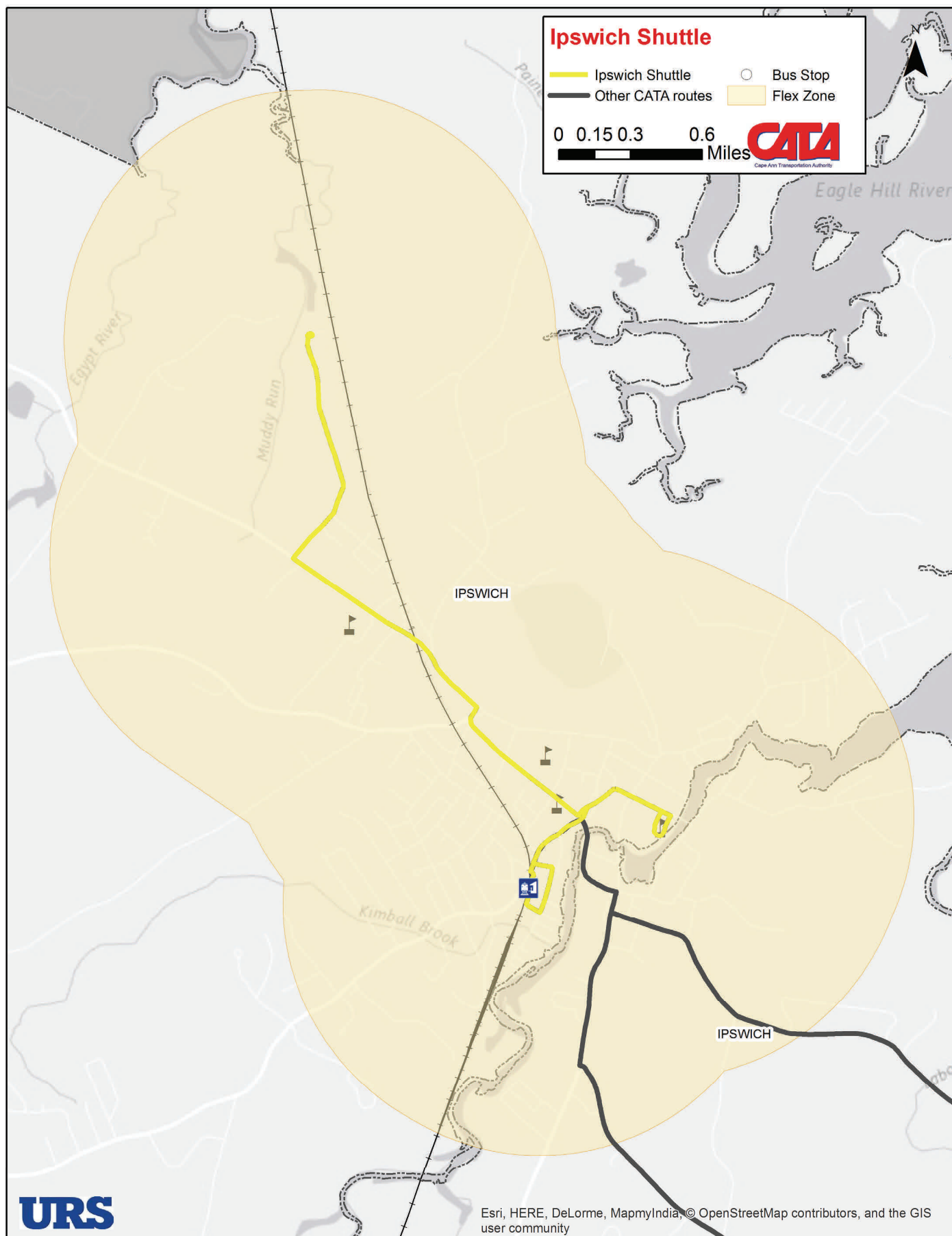
ADA Impact:

Moderate impact, with the addition of Sunday service and increased hours.

Financial	Phase 1	Phase 2	Phase 3
Annual Change in Revenue Hours	0	+186	+642
Annual Change in Revenue Miles	0	+4,982	+17,214
Estimate Change in Cost	\$0	+\$30,000	+\$103,000
Additional vehicle requirements:	0	0	0
Capital Requirement: Other	None		

Other Notes:

This is one of the top performing routes on Saturday and warrants extra service.



Current Route Performance

Productivity	Ipswich	System Average
Daily Weekday Ridership	N/A	76
Saturday Ridership	N/A	89
Sunday Ridership	N/A	210
Weekday Passengers/Hr	N/A	11
Saturday Passengers/Hr	N/A	13.56
Sunday Passengers/Hr	N/A	18.40

Financials	Ipswich	System Average
Farebox Recovery	N/A	7.9%
Weekday Subsidy per passenger	N/A	\$13.64
Saturday Subsidy per passenger	N/A	\$10.28
Sunday Subsidy per passenger	N/A	\$6.97

Route Type: Fixed Route

Route Ranking: N/A

Proposed Service Changes

	Current	Proposed
Days Operated	N/A	Mon-Fri
Route Length	N/A	11.8 mile
Route Run—Time	N/A	60 min
Weekday Headway	N/A	60 min
Saturday Headway	N/A	N/A
Sunday Headway	N/A	N/A
Hours of Operations M-F	N/A	6:00 AM—9:00 AM, 2:00 PM—5:00 PM
Hours of Operation Saturday	N/A	N/A
Hours of Operation Sunday	N/A	N/A

Route Alignment Changes:

This new route would provide local connections to the rail station for Ipswich. It would run along Route 1A/133 and operate as a flex route. It would run during peak hours only.

Environmental Justice Policy:

Analysis unknown

Phase 1:

-No change

Phase 2:

-Implement route

Phase 3:

-No change

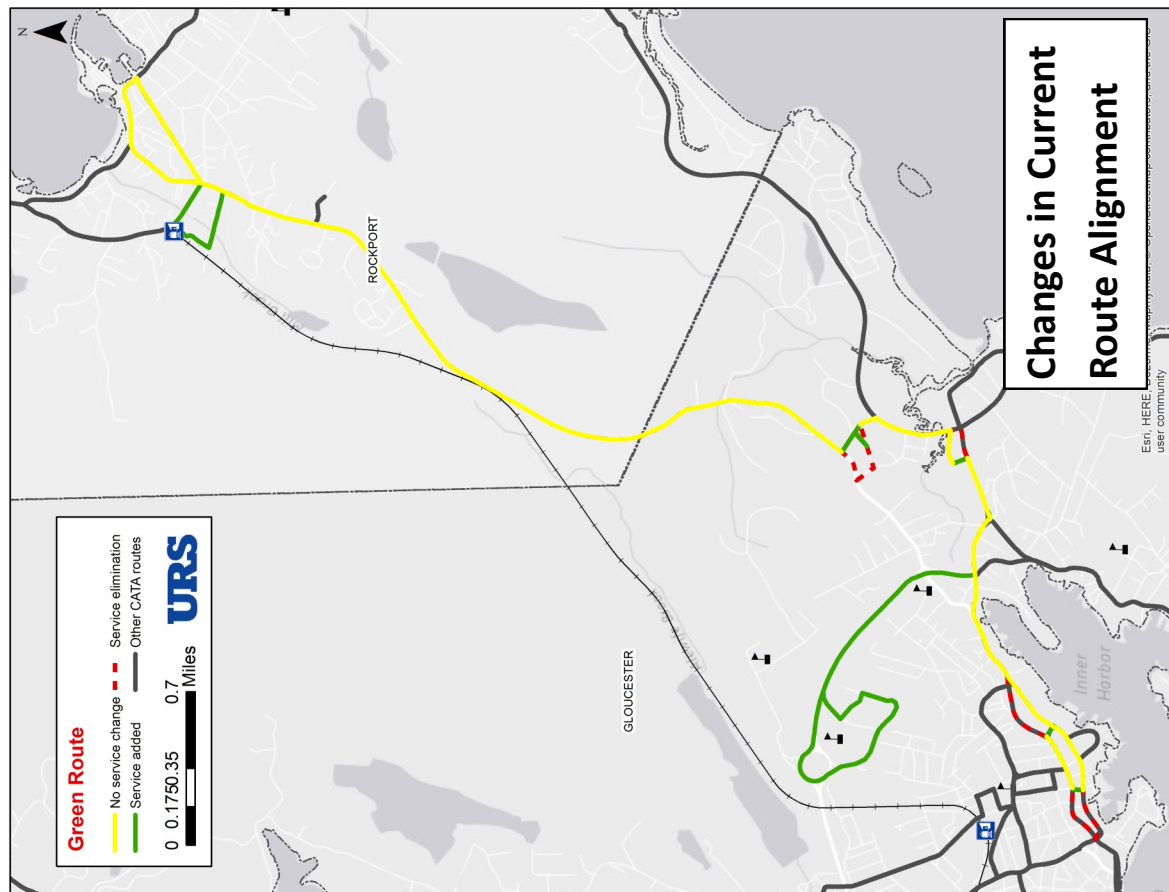
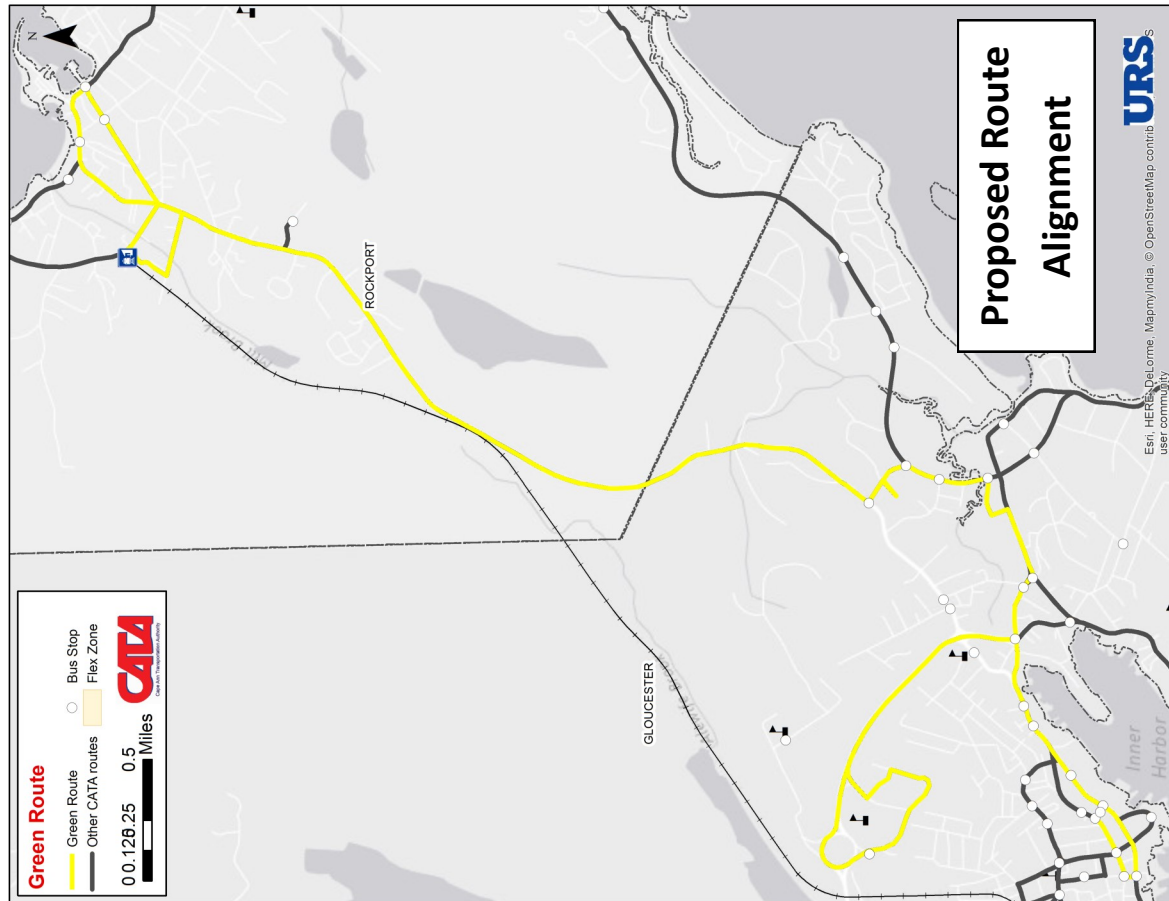
ADA Impact:

No Impact, Flex route covers ADA requirement.

Financial	Phase 1	Phase 2	Phase 3
Annual Change in Revenue Hours	0	+1,506	0
Annual Change in Revenue Miles	0	+18,069	0
Estimate Change in Cost	\$0	+\$241,000	\$0
Additional vehicle requirements:	0	1	0
Capital Requirement: Other	None		

Other Notes:

It would operate as a flex route, offering service to anyone within ¼ mile of the main line. Regular fares for customers boarding along the fixed route and additional fare for deviations. Deviation reservations would need to be made in advance.



Current Route Performance

Productivity	Green	System Average
Daily Weekday Ridership	49	76
Saturday Ridership	56	89
Sunday Ridership	N/A	210
Weekday Passengers/Hr	9.1	11
Saturday Passengers/Hr	14.1	13.56
Sunday Passengers/Hr	N/A	18.40

Financials	Green	System Average
Farebox Recovery	6%	7.9%
Weekday Subsidy per passenger	\$16.50	\$13.64
Saturday Subsidy per passenger	\$10.54	\$10.28
Sunday Subsidy per passenger	N/A	\$6.97

Route Type: Fixed Route

Route Ranking: 5/8 weekday, 4/11 Saturday

Proposed Service Changes

	Current	Proposed
Days Operated	Mon-Sat	Mon-Sun
Route Length	10.0 mile	15.5 mile
Route Run—Time	45 min	60 min
Weekday Headway	60 min	30 min
Saturday Headway	60 min	30 min
Sunday Headway	N/A	120 min
Hours of Operations M-F	7:30 AM—5:45 PM	6:00 AM—9:00 PM
Hours of Operation Saturday	9:30 AM—5:00 PM	8:00 AM —8:00 PM
Hours of Operation Sunday	N/A	10:00 AM—6:00 PM

Route Alignment Changes:

This route will now serve the Rockport train station and Gloucester Crossing. The turn around loop in Gloucester has been shortened

Environmental Justice Policy:

Analysis unknown

Phase 1:

- Change Alignment
- Extend service spans

Phase 2:

- Improve weekday and Saturday frequency to every 30 min

Phase 3:

- Implement Sunday service

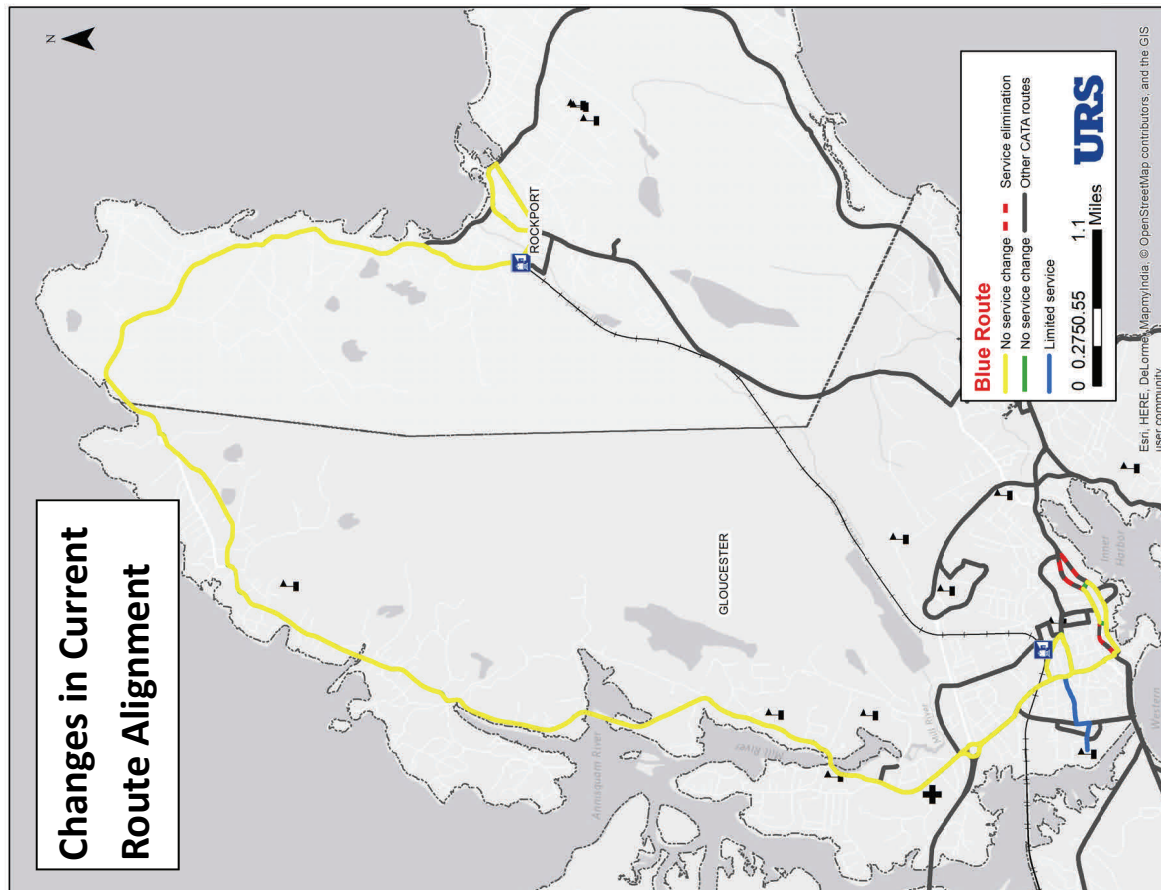
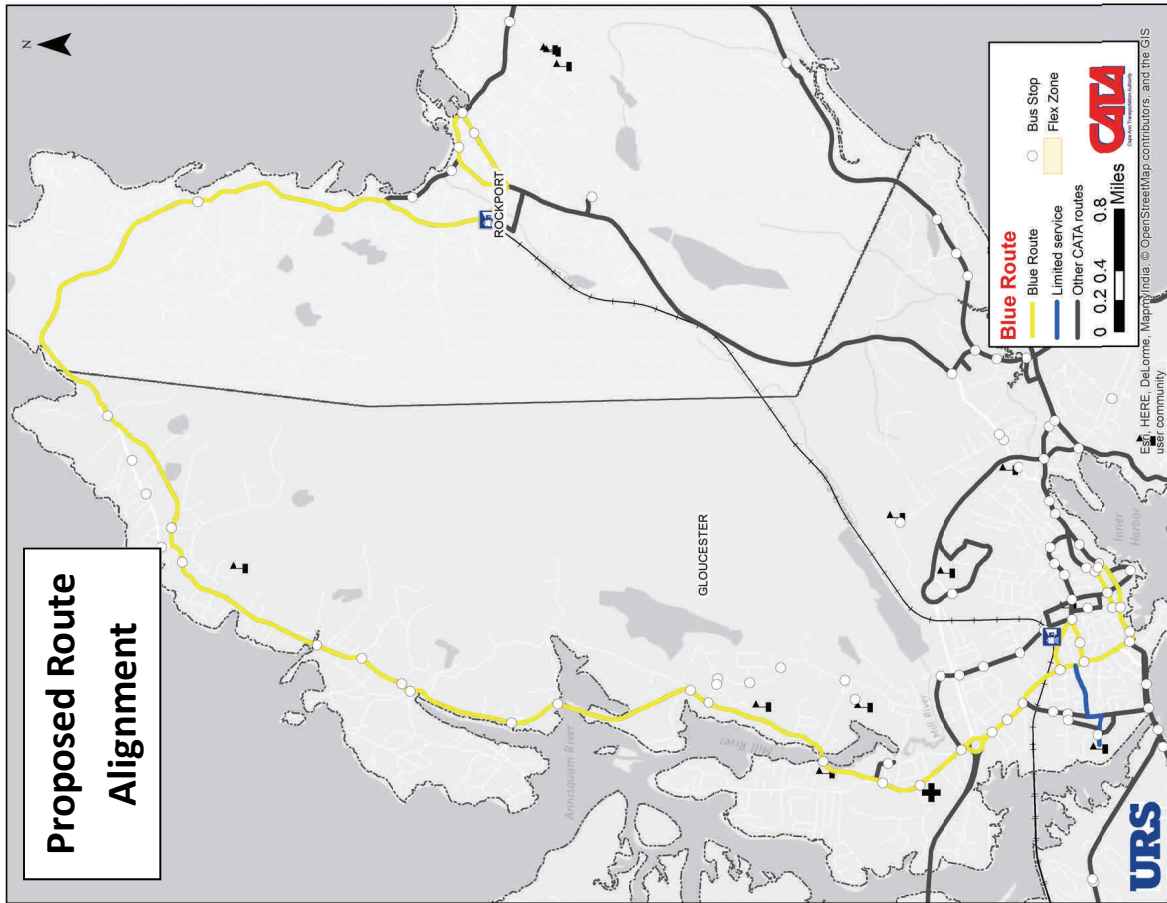
ADA Impact:

There will be a moderate impact on ADA service. Service will have to run additional hours into the evening and Sunday service must be added.

Financial	Phase 1	Phase 2	Phase 3
Annual Change in Revenue Hours	+2,221	+3,933	+292
Annual Change in Revenue Miles	+38,931	+68,960	+3,596
Estimate Change in Cost	+\$355,000	+\$629,000	+\$47,000
Additional vehicle requirements:	0	1	0
Capital Requirement: Other	None		

Other Notes:

Expanding service into the weekday evening will allow for connections with all PM peak commuter rail trains. Service to Blackburn Industrial area will be on-demand only. This route will be interlined with the Orange route on every Green Route trip to provide a one seat ride from the numerous housing areas on the Orange route and shopping areas on the Green route.



Current Route Performance

Productivity	Blue	System Average
Daily Weekday Ridership	125	76
Saturday Ridership	46	89
Sunday Ridership	N/A	210
Weekday Passengers/Hr	12.4	11
Saturday Passengers/Hr	9.2	13.56
Sunday Passengers/Hr	N/A	18.40

Financials	Blue	System Average
Farebox Recovery	8%	7.9%
Weekday Subsidy per passenger	\$11.94	\$13.64
Saturday Subsidy per passenger	\$16.37	\$10.28
Sunday Subsidy per passenger	N/A	\$6.97

Route Type: Fixed Route

Route Ranking: 3/8 weekday, 6/11 Saturday

Proposed Service Changes

	Current	Proposed
Days Operated	Mon-Sat	Mon-Sat
Route Length	22.2 mile	21.5 mile
Route Run—Time	72 min	90 min
Weekday Headway	120 min	60 min
Saturday Headway	120 min	120 min
Sunday Headway	N/A	N/A
Hours of Operations M-F	6:15 AM—6 :30PM	6:00 AM—9:00 PM
Hours of Operation Saturday	8:30 AM—5:15 PM	8:00 AM —8:00 PM
Hours of Operation Sunday	N/A	N/A

Route Alignment Changes:

The turn around loop in Gloucester has been shortened.

Environmental Justice Policy:

Analysis unknown

Phase 1:

- Change Alignment
- Extend service spans
- Improve weekday frequency to every 90 min
- Improve Saturday frequency

Phase 2:

- Improve weekday frequency to every 60 min

Phase 3:

- No changes

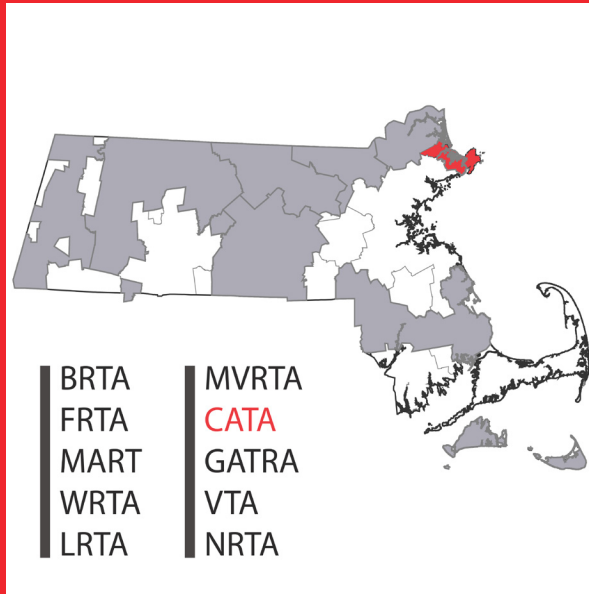
ADA Impact:

There will be a minimal impact on ADA service. Service will have to run additional hours into the evening.

Financial	Phase 1	Phase 2	Phase 3
Annual Change in Revenue Hours	+237	+1,383	0
Annual Change in Revenue Miles	+4,746	+27,438	0
Estimate Change in Cost	+\$38,000	+\$221,000	\$0
Additional vehicle requirements:	0	1	0
Capital Requirement: Other	None		

Other Notes:

Expanding service into the weekday evening will allow for connections with all PM peak commuter rail trains. On select trips (one in the AM and one in the PM) the route will service the High School instead of the train station.



Chapter 8

AECOM / URS
TMD
 Burke & Company



8. CONCLUSION

Recommendations were developed using a comprehensive process that incorporated public outreach, a diverse steering committee, meetings with CATA operations, an analysis of existing transit service, and the Cape Ann local/regional market. Strategies to improve the system were developed based on the goals and objectives outlined in Chapter 2. In June 2015, CATA gave a briefing of the project and recommendations to their board.

The proposed recommendations will help improve mobility in the region and improve service efficiency. The three phase approach allows CATA to plan for future service and seek the necessary funding and equipment that would be needed. Phase 1 would require a 45% increase in funding in order to standardize frequency, separate out school trippers as their own routes, and extend weekday service into the evening. This large increase in funding is largely due to the high operating cost per hour for CATA. Phases 2 and 3 would require more funding (Table 28). In Phase 1 alignments have been revised to provide direct service that is bidirectional and services high demand areas. Service spans have been increased to add evening service and frequencies have been standardized. In Phase 2 service frequencies have been further improved. In Phase 3 Sunday service has been added to select routes and service to Manchester by the Sea should be explored. These improvements would help CATA achieve their goals of increasing frequency of service, better serving the senior citizen populations, bridging the gap between CATA and MBTA service, increasing tourism ridership, and improving overall transit services.

Table 28. Phase Requirements

Phase	Additional funding needed	New cost of service	Percent increase from previous
Phase 1	\$1,136,000	\$3,636,000	45.4%
Phase 2	\$1,328,000	\$4,964,000	36.5%
Phase 3	\$416,000	\$5,380,000	8.4%
Total	\$3,168,000	N/A	115.2%

Service guidelines have been established to monitor service in the future with performance measures to evaluate a route's health. Recommended performance measures to monitor existing and future routes include:

- **Passengers/Hour:** Number of total monthly and annual passengers divided by the corresponding revenue-hours.
- **Subsidy/Passenger:** Total expenses minus fare revenue divided by ridership.
- **Farebox Recovery:** The percentage of operating costs covered by fares collected, calculated by the fares collected divided by the cost to operate the route.

- **Cost/Revenue-Hour:** An excellent indicator of efficiency is cost per revenue-hour of service. Costs per hour should be analyzed by route and compared to overall system averages.
- **Late Trips:** The percentage of fixed-route trips which operate late or are missed should be recorded and reported. The recommended standard for late trips is any trip that is more than five minutes behind schedule.
- **Service/Road Calls:** the number of service/road calls divided by the number of revenue miles. This measure is typically measured for the entire system and not individual routes. This monitors routine maintenance and vehicle performance.
- **Accidents/100,000 miles:** Measure of driver safety. There must be a standard practice for defining what an accident is.

These performance measures can be used to create benchmarks for CATA service operation, which in turn will help CATA track progress and set goals for the performance of the route. Benchmarks will also assist CATA in measuring the impact of the proposed recommendations on service. The recommendations include modifying the alignment of eight of the routes in order provide better connections, eliminating redundancy, and servicing developing areas as well as creating three new routes (Table 29). In addition to alignment changes there are several proposed service changes including extended weekday and Saturday service hours on many of the routes, improved frequencies and the addition of Sunday service on 4 of the routes.

Table 29. Summary of Recommendations

Bus Route	Alignment	Schedule
Blue	Make turnaround loop in Gloucester smaller	-60 minute frequency -Service span 6 AM to 9 PM weekdays -Service span 8 AM to 8 PM Saturdays
Red	No change	-60 minute frequency -Service span 6 AM to 9 PM weekdays -Service span 8 AM to 8 PM Saturdays
Green	Service to Industrial park on select trips. Service to Gloucester Crossing and Rockport train station added	-Service span 6 AM to 9 PM weekdays -Service span 8 AM to 8 PM Saturdays -Sunday service 10 AM to 6 PM -Weekday and Saturday frequency 30 min
Yellow	Consolidate service along Hesperus/Norman into Magnolia	-120 minute frequency -Service span 6 AM to 9 PM weekdays
Purple	Terminate service at West Gloucester Station	-60 minute frequency weekday -Service span 6 AM to 9 PM weekdays -120 minute frequency weekend
Orange	Bidirectional service, split into 2 routes	-30 minute frequency weekday -Service span 6 AM to 9 PM weekdays -Service span 8 AM to 8 PM Saturdays -Sunday service 8 AM to 6 PM

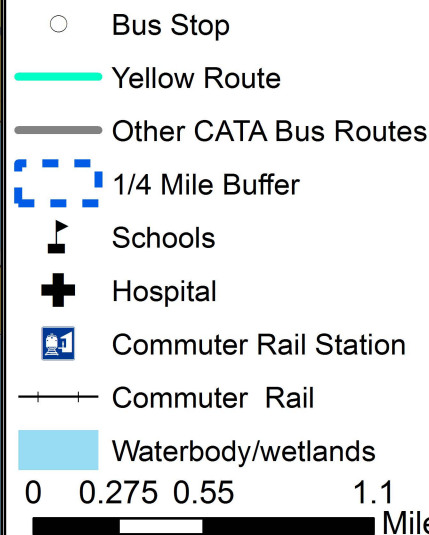
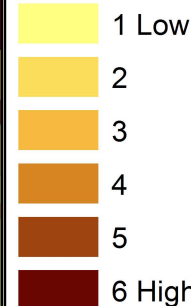
Bus Route	Alignment	Schedule
Mall Shuttle	No change	-60 minute frequency -Service span 10 AM to 6 PM Saturdays -Service span 10 AM to 6 PM Sundays
City of Beverly Shuttle	Cannot change service per contract with City of Beverly, but a split route with bidirectional service would better serve city's needs	No change
Ipswich Shuttle	New Route	-Flex route with peak hour service only, 60 minute frequency
Rockport Shuttle	No change	No change
Stage Fort Trolley	No change	No change
Ipswich-Essex Explorer	No change	No change
Route 133 Tripper	Essex town line to Gloucester via the High School	2 trips daily
Western Ave Tripper	Magnolia to Gloucester HS via Western Ave	2 trips daily
Pink Route	New route from splitting the Orange Route into 2 routes	New route

Appendix A

Market Demand Maps

Route - Yellow

Level of Potential Transit Demand



Demand is based on the population density, employment density, percent of vehicleless households, proximity to schools park and ride lots, commuter rail stations and hospitals, median household income, the enrollment at local colleges and universities, elderly population and the percent of households with people with disabilities.



Route - Stage Fort

Level of Potential Transit Demand

- 1 Low
- 2
- 3
- 4
- 5
- 6 High

- Bus Stop
- Stage Fort
- Other CATA Bus Routes
- ⋯ 1/4 Mile Buffer
- 🏫 Schools
- ⛑ Hospital
- 🚊 Commuter Rail Station
- Commuter Rail
- 🌊 Waterbody/wetlands

0 0.225 0.45 0.9
Miles

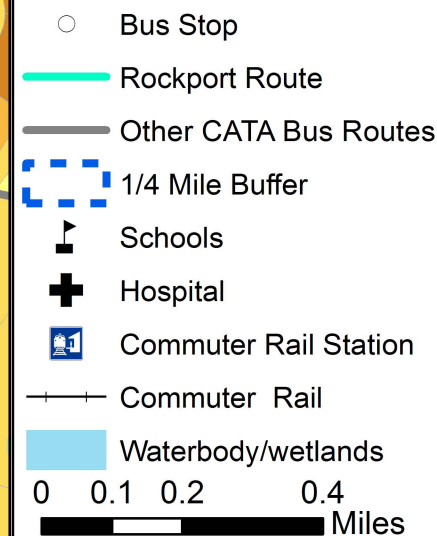
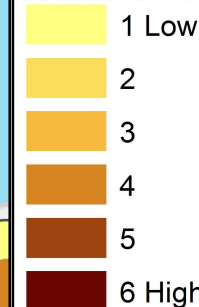
Demand is based on the population density, employment density, percent of vehicleless households, proximity to schools park and ride lots, commuter rail stations and hospitals, median household income, the enrollment at local colleges and universities, elderly population and the percent of households with people with disabilities.

URS



Route - Rockport

Level of Potential Transit Demand

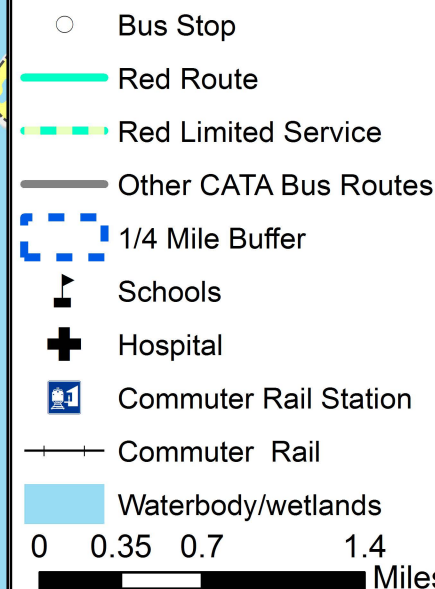
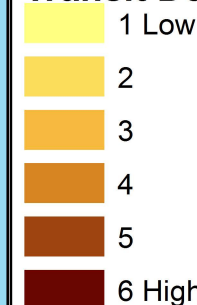


Demand is based on the population density, employment density, percent of vehicleless households, proximity to schools park and ride lots, commuter rail stations and hospitals, median household income, the enrollment at local colleges and universities, elderly population and the percent of households with people with disabilities.



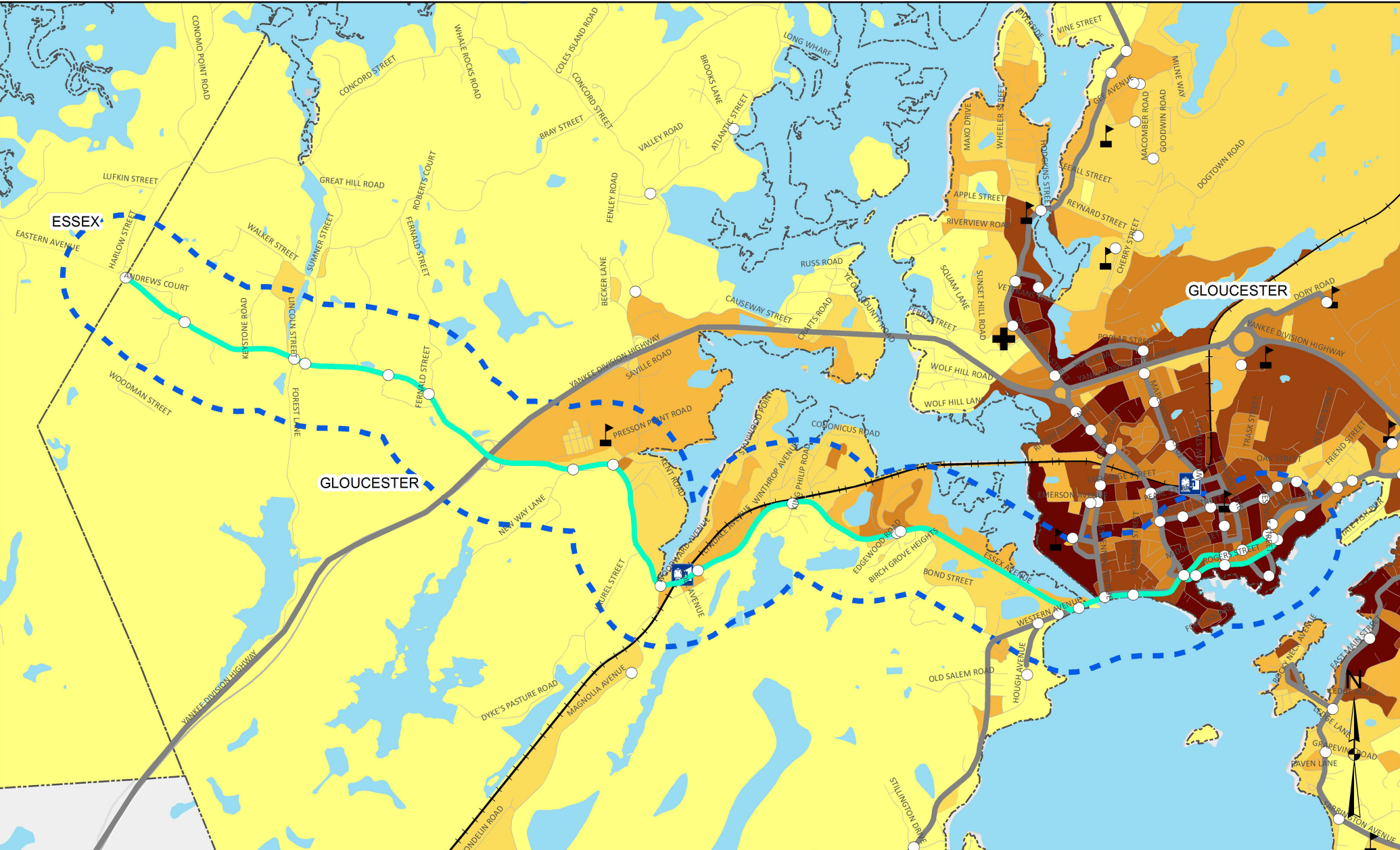
Route - Red

Level of Potential Transit Demand



Demand is based on the population density, employment density, percent of vehicleless households, proximity to schools park and ride lots, commuter rail stations and hospitals, median household income, the enrollment at local colleges and universities, elderly population and the percent of households with people with disabilities.



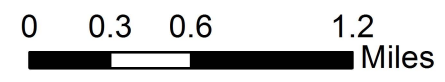


Route - Purple

Level of Potential Transit Demand

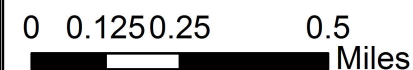
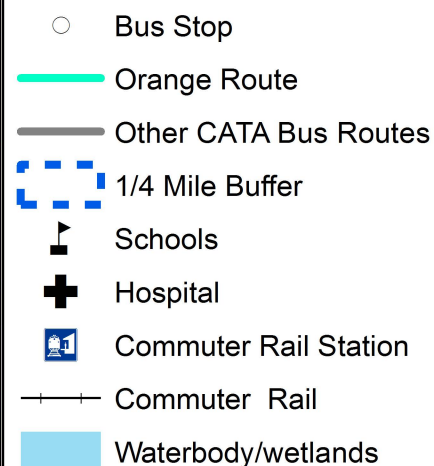
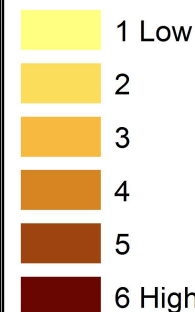
- | | | |
|--------|-----------------------|-----------------------|
| 1 Low | Bus Stop | Hospital |
| 2 | Purple Route | Commuter Rail Station |
| 3 | Other CATA Bus Routes | Commuter Rail |
| 4 | 1/4 Mile Buffer | Waterbody/wetlands |
| 5 | Schools | |
| 6 High | | |

Demand is based on the population density, employment density, percent of vehicleless households, proximity to schools park and ride lots, commuter rail stations and hospitals, median household income, the enrollment at local colleges and universities, elderly population and the percent of households with people with disabilities.



Route - Orange

Level of Potential Transit Demand



Demand is based on the population density, employment density, percent of vehicleless households, proximity to schools park and ride lots, commuter rail stations and hospitals, median household income, the enrollment at local colleges and universities, elderly population and the percent of households with people with disabilities.

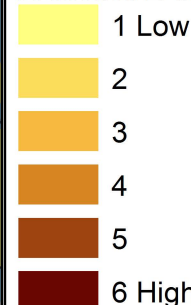




Cape Ann Transportation Authority

Route - Ipswich/Essex

Level of Potential Transit Demand



○ Bus Stop

— Ipswich - Essex Explorer

— Other CATA Bus Routes

□ 1/4 Mile Buffer

🏫 Schools

⛑ Hospital

🚊 Commuter Rail Station

— Commuter Rail

Waterbody/wetlands

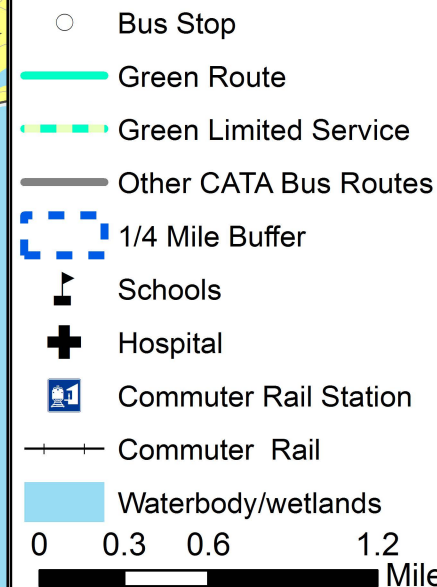
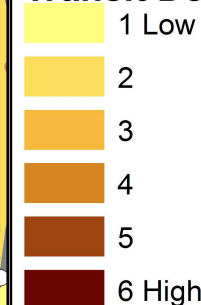
0 0.35 0.7 1.4
Miles

Demand is based on the population density, employment density, percent of vehicleless households, proximity to schools park and ride lots, commuter rail stations and hospitals, median household income, the enrollment at local colleges and universities, elderly population and the percent of households with people with disabilities.



Route - Green

Level of Potential Transit Demand



Demand is based on the population density, employment density, percent of vehicleless households, proximity to schools park and ride lots, commuter rail stations and hospitals, median household income, the enrollment at local colleges and universities, elderly population and the percent of households with people with disabilities.





Route - Danvers

Level of Potential Transit Demand

- 1 Low
- 2
- 3
- 4
- 5
- 6 High

- Bus Stop
- Danvers Route
- Other CATA Bus Routes
- - - 1/4 Mile Buffer
- ▲ Schools

- ⛶ Hospital
- 🚊 Commuter Rail Station
- Commuter Rail
- Waterbody/wetlands

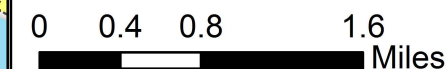
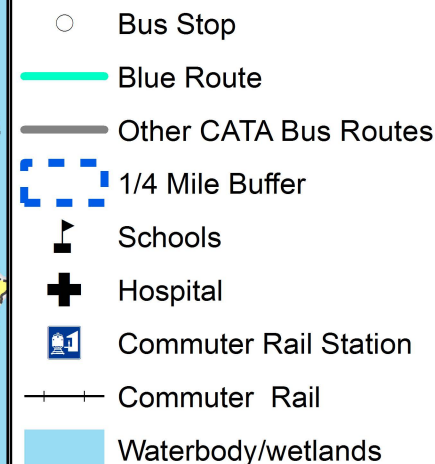
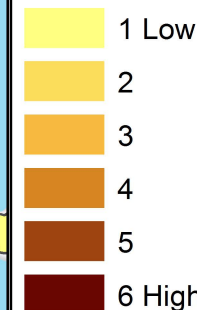
Demand is based on the population density, employment density, percent of vehicleless households, proximity to schools park and ride lots, commuter rail stations and hospitals, median household income, the enrollment at local colleges and universities, elderly population and the percent of households with people with disabilities.

0 0.75 1.5 3 Miles



Route - Blue

Level of Potential Transit Demand



Demand is based on the population density, employment density, percent of vehicleless households, proximity to schools park and ride lots, commuter rail stations and hospitals, median household income, the enrollment at local colleges and universities, elderly population and the percent of households with people with disabilities.



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Appendix B

Recommendation Memo

Client: Cape Ann Transportation Authority
Project Name: Comprehensive Service Assessment
Issue Date: April 07, 2015
To: Paul Talbot and CATA
From: Stephen Gazillo, *URS Corporation*

CATA Comprehensive Service Assessment – Recommendations

The following outlines the recommendations and alternatives to improve service for CATA based on the comments received from the November 2014 workshop. Opportunities were identified to improve connectivity, streamline service, and add service. A table can be found at the end which outlines all recommendations by route; additional information and maps have been provided for select routes.

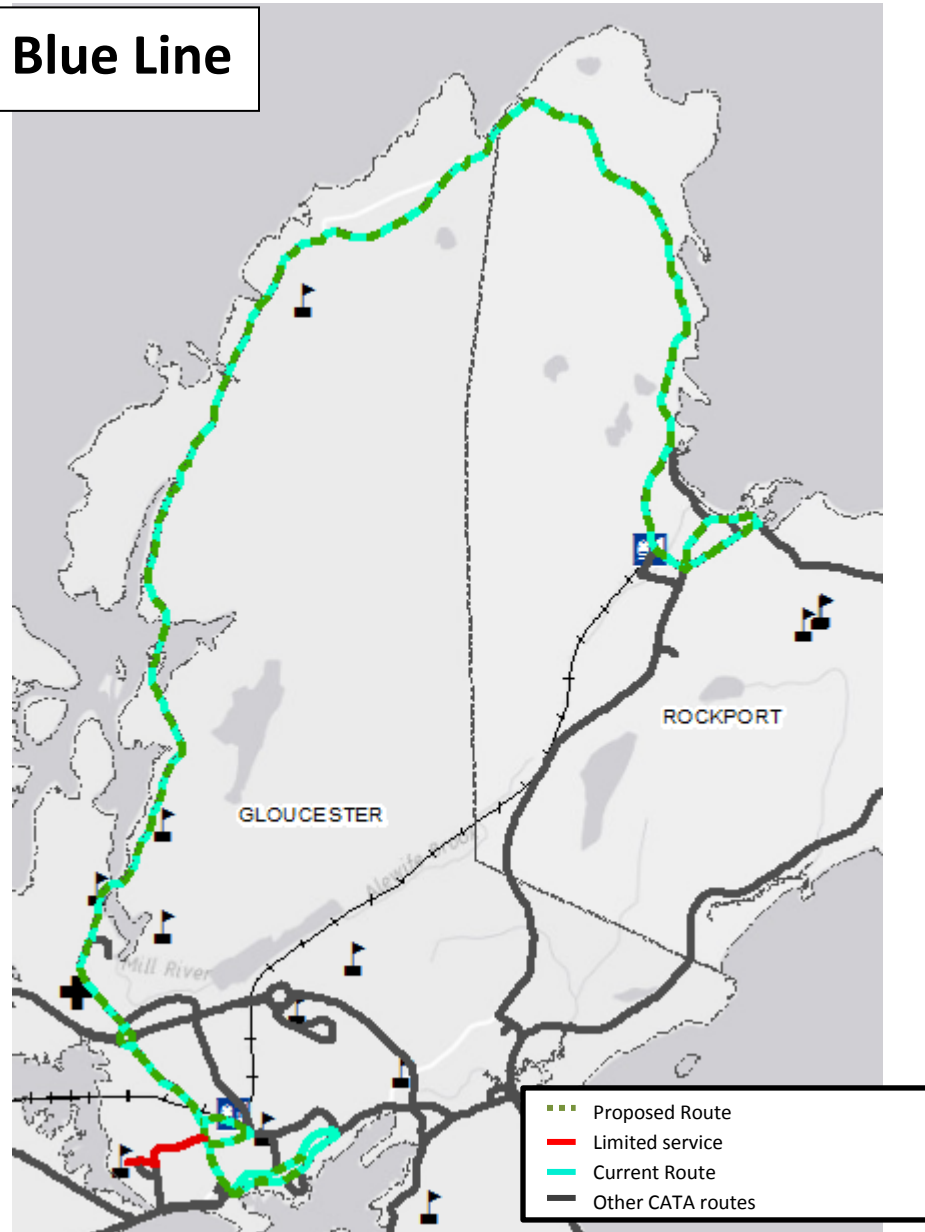
Phasing Plan

In Phase 1 alignments have been revised to provide direct service that is bidirectional and services high demand areas. Service spans have been increased to add evening service and frequencies have been standardized. In Phase 2 service frequencies have been further improved. In Phase 3 Sunday service has been added to select routes and service to Manchester by the Sea should be explored. The proposed recommendations are based off of current performance statistics, transit demand analysis, feedback from the workshop, and the goals and objectives established by CATA.

Recommendation Changes

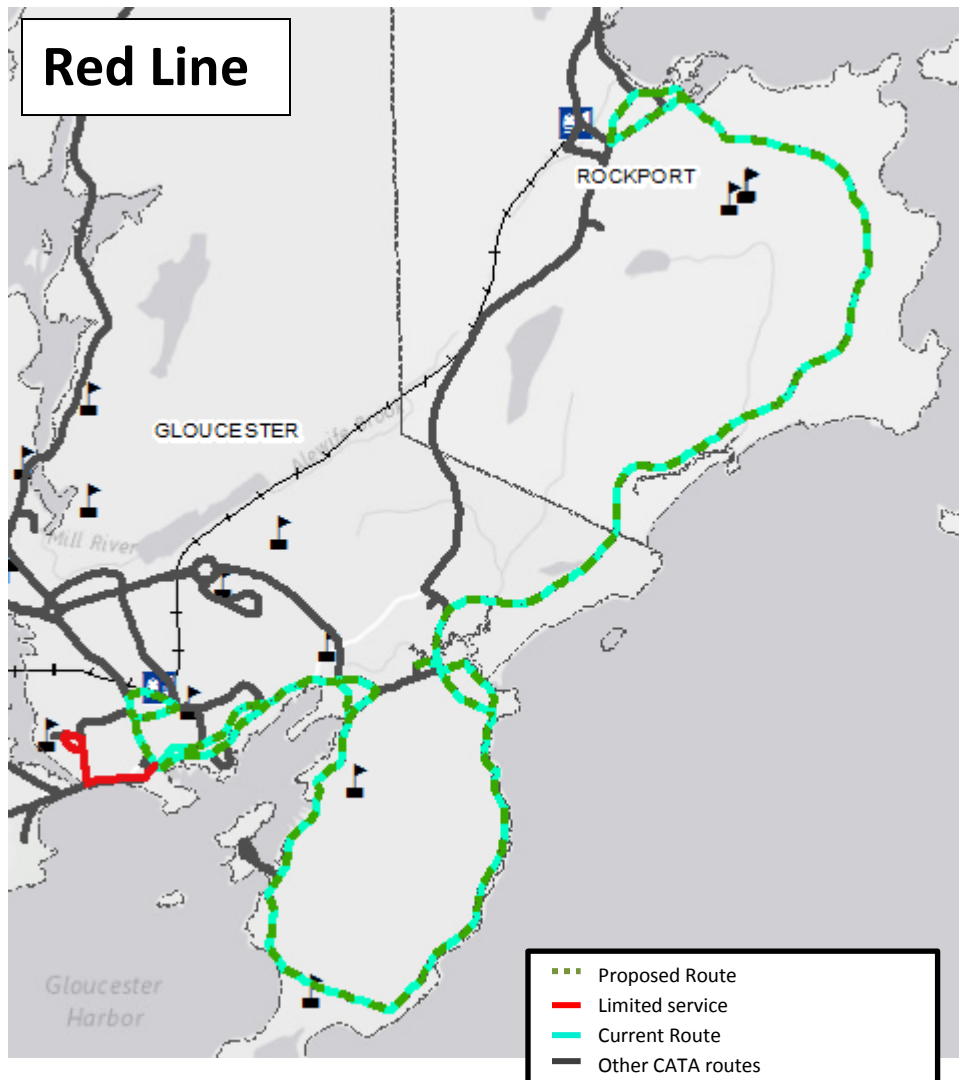
Blue

This route will be interlined with the red line to create consistent frequencies throughout the day. To achieve this, the turnaround loop in Gloucester has been shortened. Through interlining the frequency can be improved to 90 minutes using the same vehicle resources in Phase 1 and further improved in Phase 2 to 60 minutes with an additional vehicle. The Blue Route is an above average performing route and a candidate for service investment. Expanding weekday service into the evening will allow for connection with all PM peak commuter rail trains and add evening service. We recommend either servicing the school on select trips only instead of the train station or creating a separate route for the school tripper with a distinct schedule from the Blue Route.

Blue Line**Red**

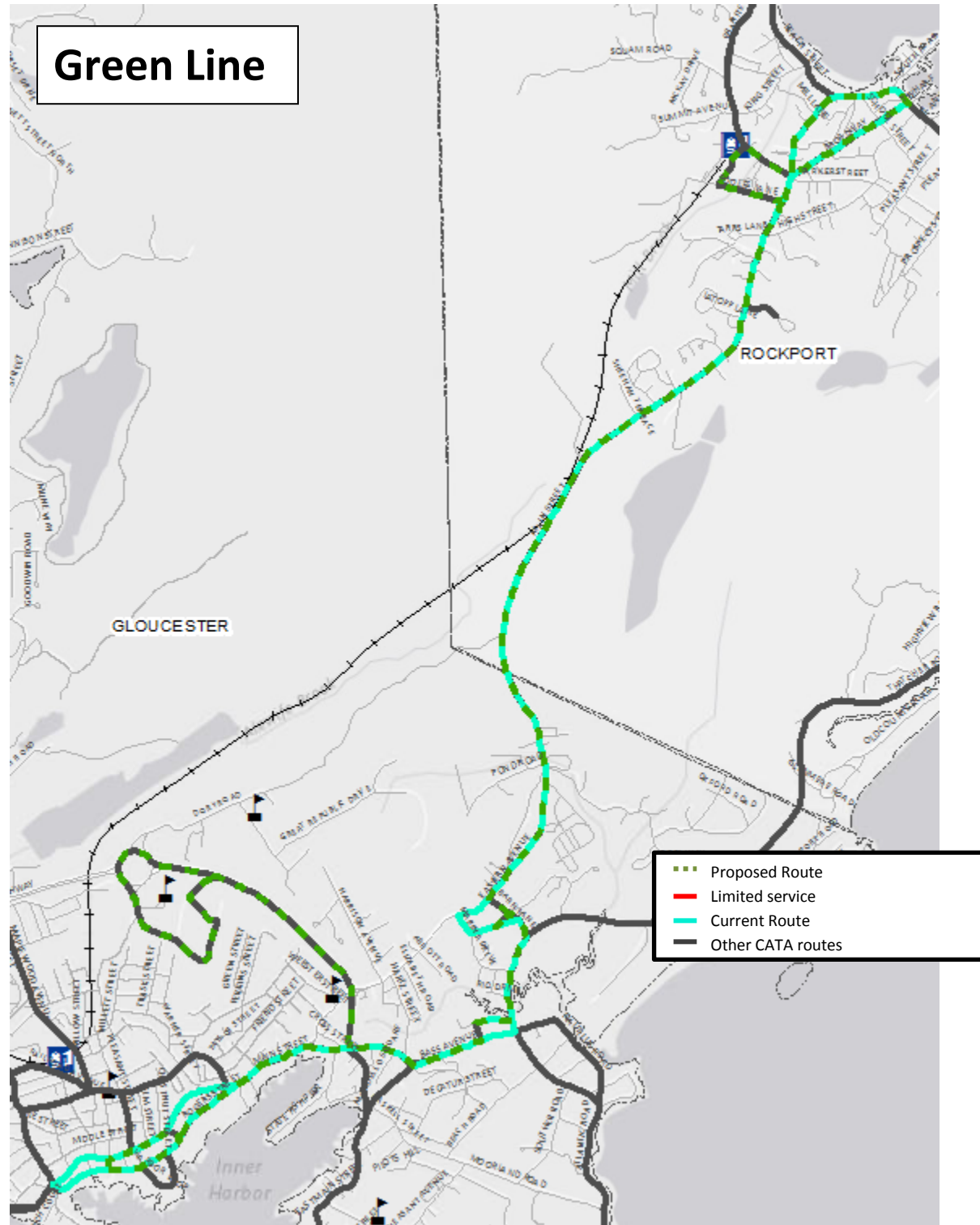
This route will be interlined with the blue line to create consistent frequencies throughout the day. Interlining will reduce layover time and allows for more trips to occur during the same span of time. It also allows for through service and the elimination of some transfers. Increasing frequencies will attract more riders. As with the Blue route, improvements in weekday service hours will provide evening service and allow for more connections with the commuter rail. Improvements in frequency and service hours are recommended because it is one of three routes to experience a weekday growth in ridership between FY 2012 and FY 2014 despite an overall system decline. This indicates a stronger route. We

recommend either servicing the school on select trips only instead of the train station or creating a separate route for the school tripper with a distinct schedule from the Red Route.



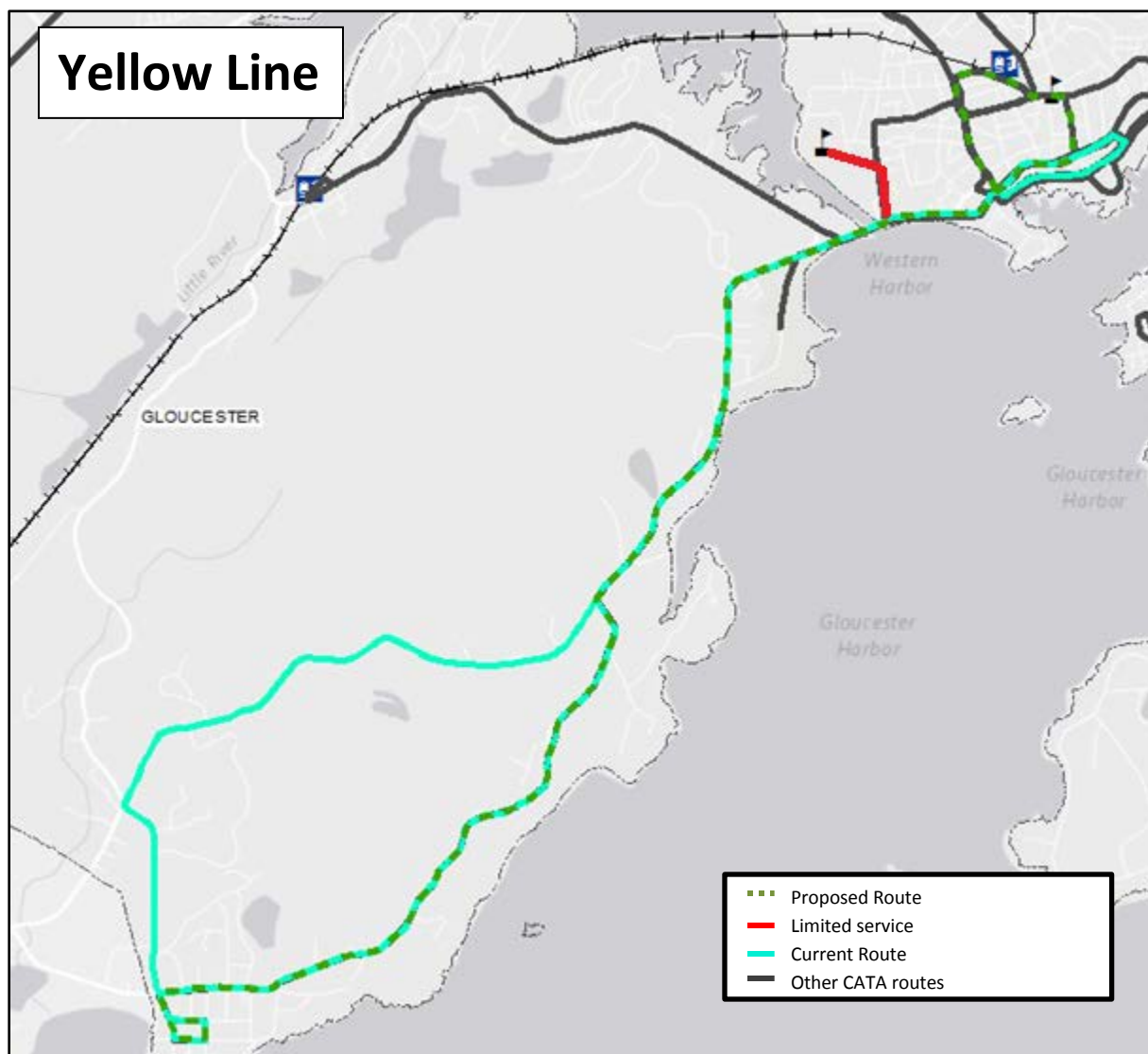
Green

The alignment on this route was adjusted to serve the Rockport Station and Gloucester crossing. Service to Blackburn Industrial park should be on-demand only due to very little ridership. The adjustment in the alignment was made in order to provide service to Gloucester Crossing with the streamlining of the Orange Route. Service to the Rockport Train Station has been added. This route is a candidate for Sunday service because it services numerous shopping centers and has above average productivity. In Phase 1 every other Orange Route can be interlined with the Green route so that at least one trip per hour provides a one seat ride between the numerous housing complexes and Gloucester Crossing. In Phase 2 the frequency has been improved to 30 minutes on this route and half the trips would be interlined with the Orange Route and the other half with the new Pink Route.



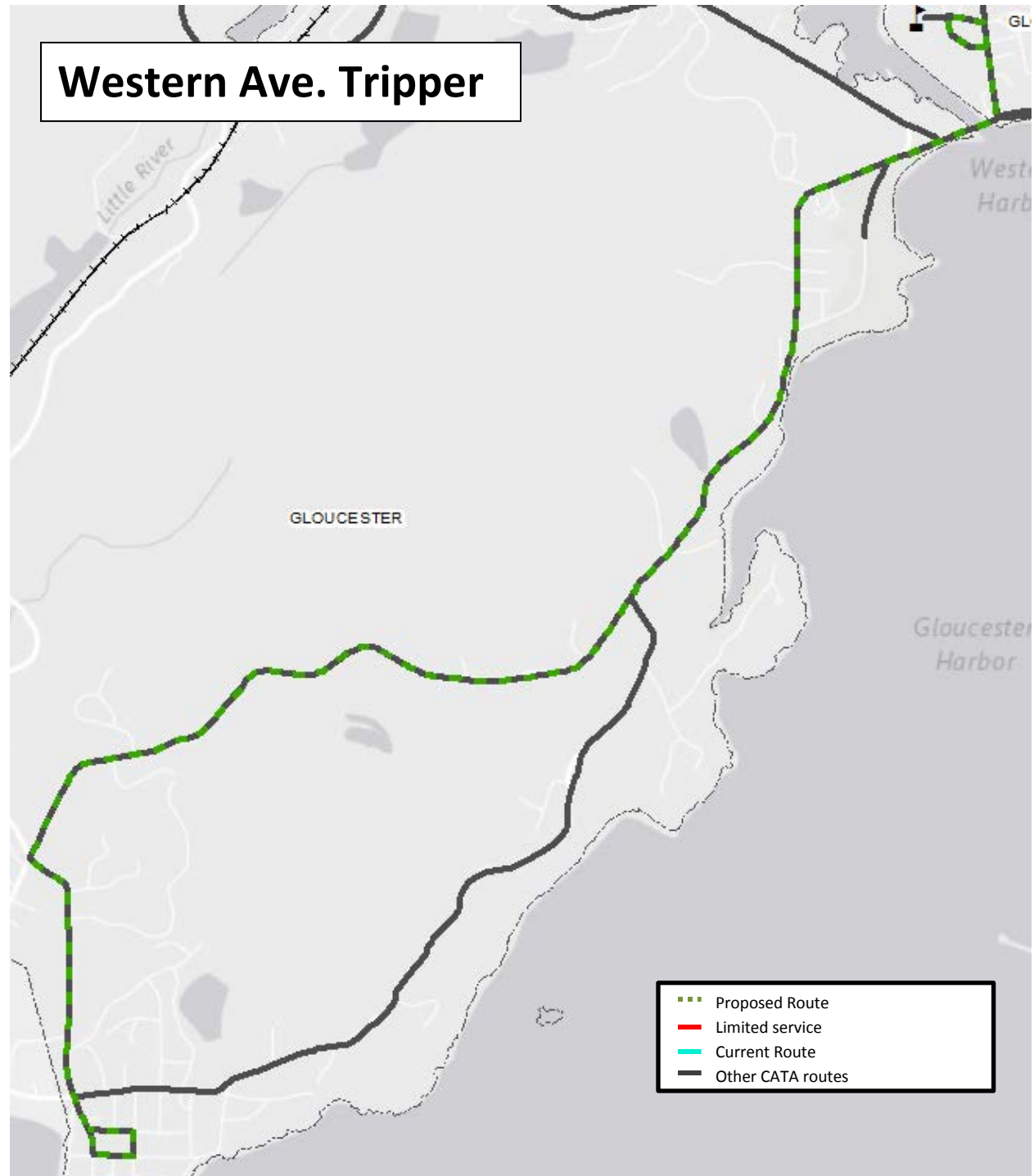
Yellow

This route has very low ridership. Recommendations include consolidating service along Hesperus/Norman and adding service to Gloucester station to increase connectivity between downtown and the rail station. Consolidating service along Hesperus/Norman will eliminate a large loop and provide bidirectional service. There was found to be a greater demand along Hesperus/Norman than Western Ave. A school tripper will service Western Ave 2 times a day. Consistent headways should be established to encourage ridership and later service will provide increased connectivity to commuter rail trains. The high school can be serviced on select trips. If low ridership persists then consider flex service, route discontinuation or school tripper service only. Weekend service should be monitored and if low ridership persists then service should be eliminated. If low ridership does not persist then extension to Manchester by the Sea should be explored in Phase 3.



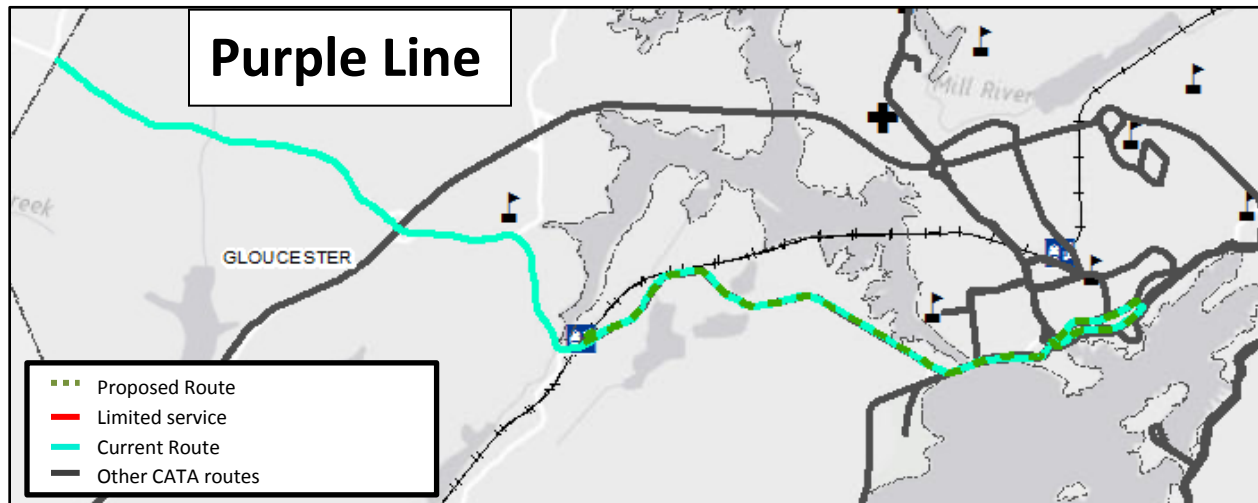
Western Ave Tripper

This route is a school tripper only and will run from Magnolia line to the High School. A separate route has been created for tripper service to streamline the Yellow Route schedule and increase service on that routes. Two trips a day will run on the tripper service and they will be timed to the school bell schedule.



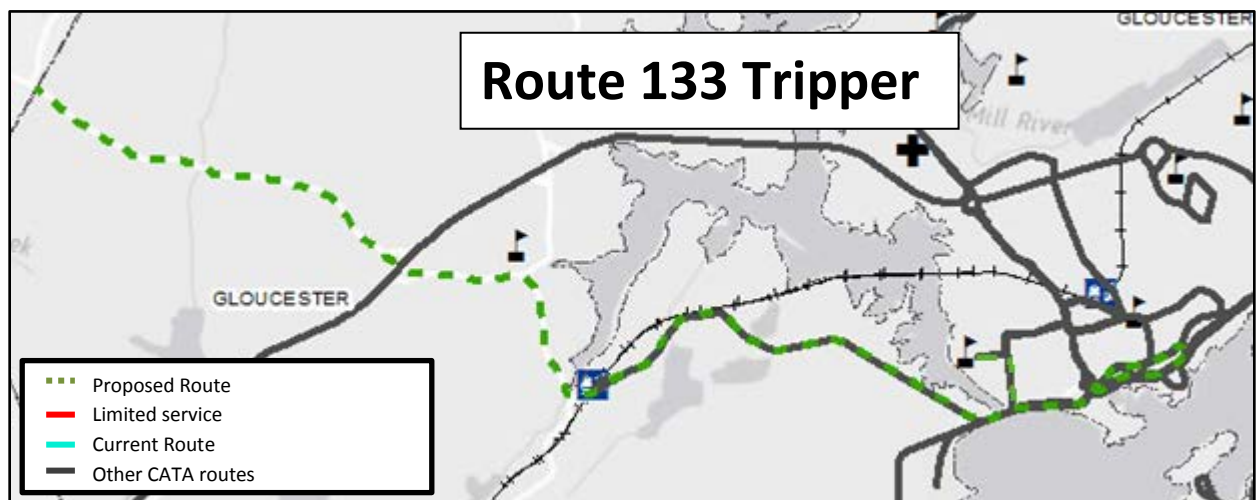
Purple

Due to the lack of an anchor point along the Gloucester/Essex line the recommendation for this route is to terminate service at the West Gloucester station and operate a separate school tripper only between Gloucester/Essex town line and Gloucester High School with two trips a day. This route is the lowest performing route because of the infrequent service and limited hours. In an effort to improve the routes performance a consistent 60 minute headway should be established. This will also improve connections with the commuter rail trains. Expanding service past 4 PM on the weekdays will open up transit to individuals in the workforce. In Phase 1 this route could be interlined with the Orange route.



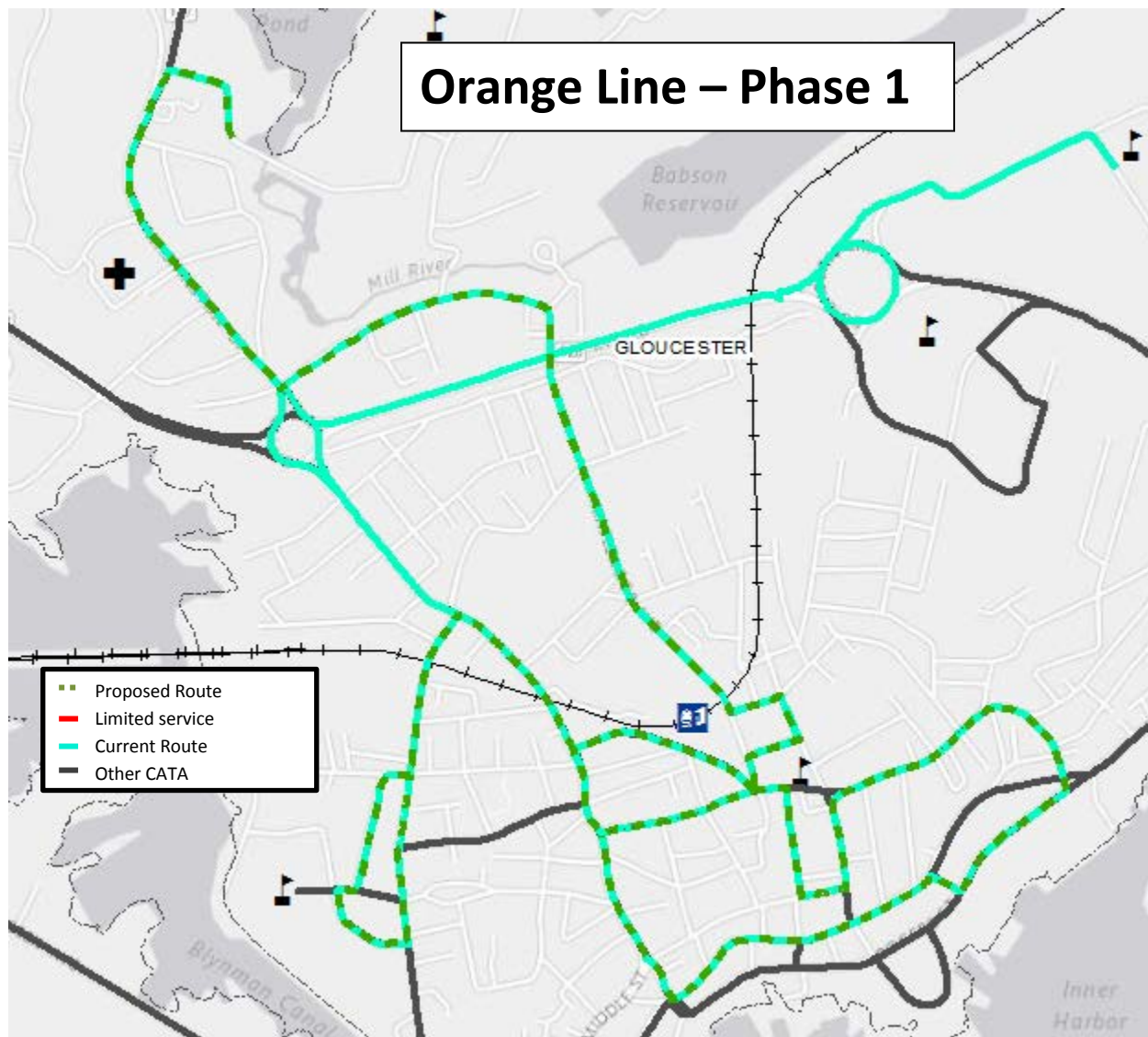
Route 133 Tripper

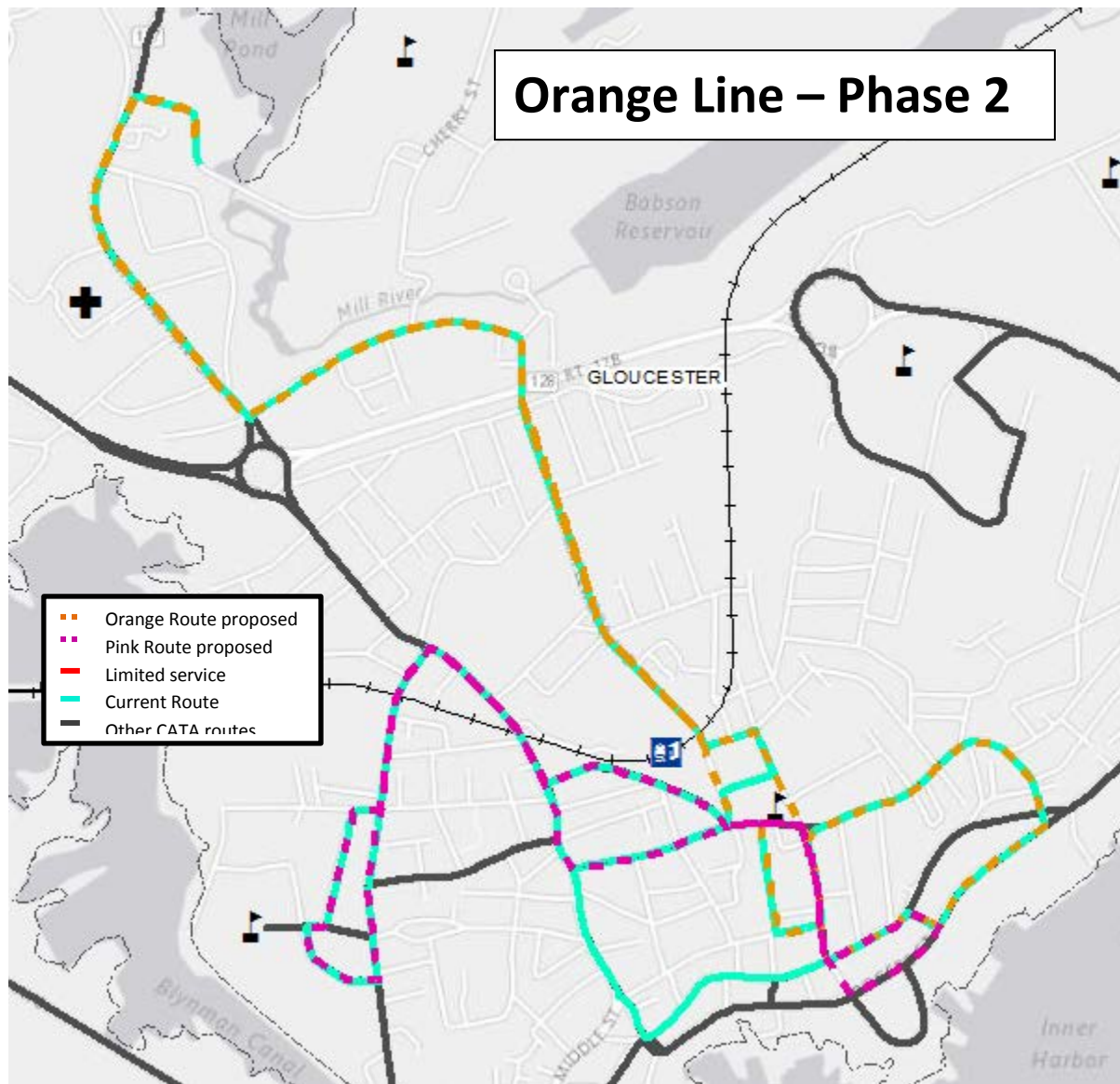
This route is a school tripper only and will run from the Essex town line to downtown Gloucester via the High School. A separate route has been created for tripper service to streamline the Purple Route schedule and increase service between the Train Station and downtown. The alignment is the same as the current purple line but only 2 trips a day will run.



Orange

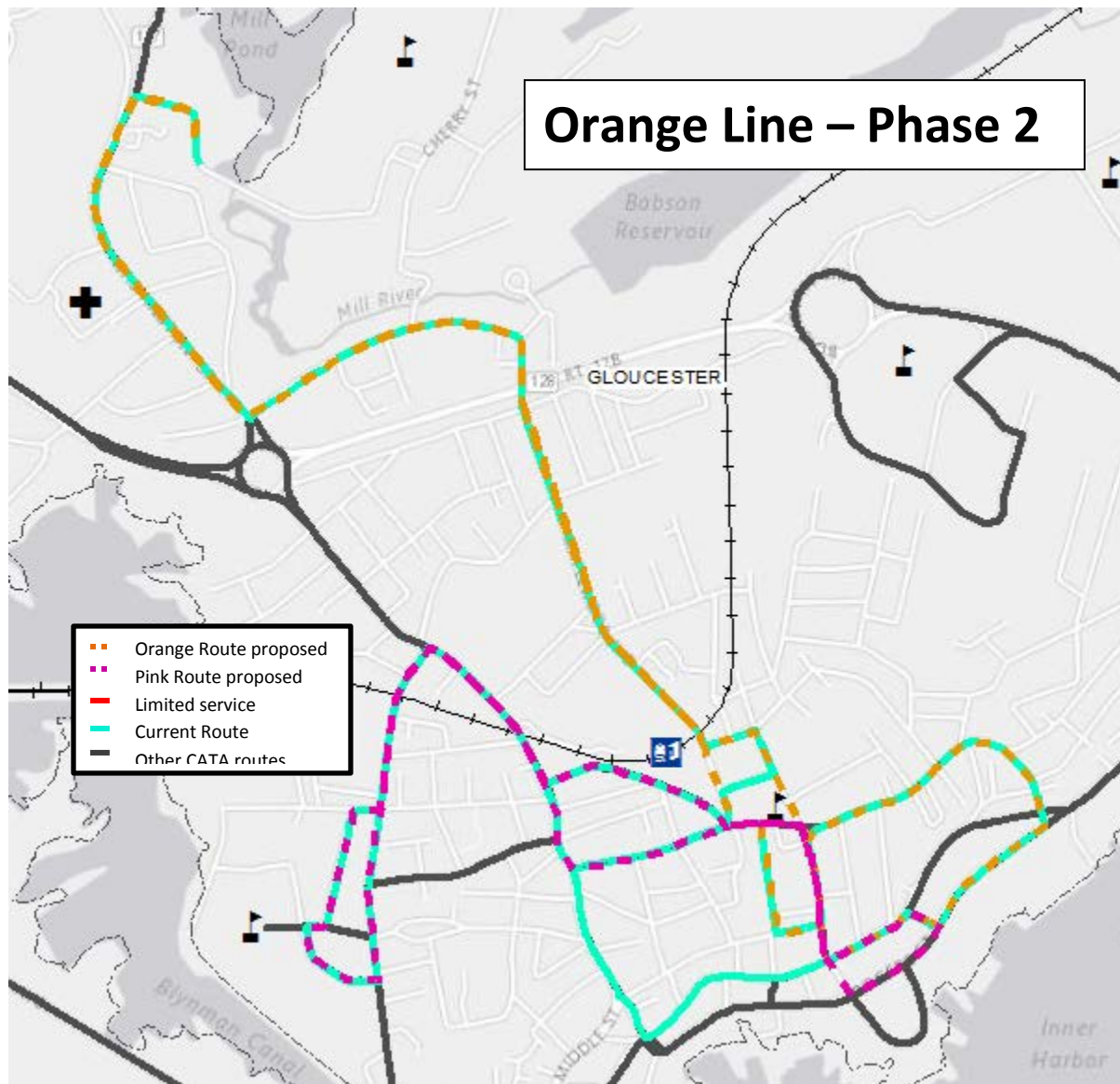
In Phase 1 the recommendation removes Washington St, Blackburn Park and Gloucester Crossing from this route. Gloucester Crossing will be on the Green Route as will Blackburn Park (on-demand only). The frequency has been improved to 30 minutes. To achieve this half of the Orange line trips will be interlined with the Green Route and the other half with the yellow and Purple routes. In Phase 2 this route would be split into two routes which would provide bi directional service. The Orange route would service Mill Pond Medical, Addison Gilbert Hospital, Poplar Park housing, Sheedy Park, Dale Ave, and Curtis Clark/ Armory senior housing. The Pink route would service Lincoln Park, the VA agent, the food pantry, the high school, the train station and McPherson housing. The orange would be interlined with the Green Route on half of the trips and the new Pink Route on the other half. This route is a candidate for Sunday service because it is one of the top three Saturday routes for ridership.





Pink

This is a new route that would begin in Phase 2 by breaking the Orange route into two routes. The Pink route would service Lincoln Park, the VA agent, the food pantry, the high school, the train station and McPherson housing. It would have 30 minute frequencies during the weekdays. It would be interlined with the Green Route on half of the trips and the Orange Route on the other half. This route would also operate on Saturdays in Phase 2 and Sundays in Phase 3.



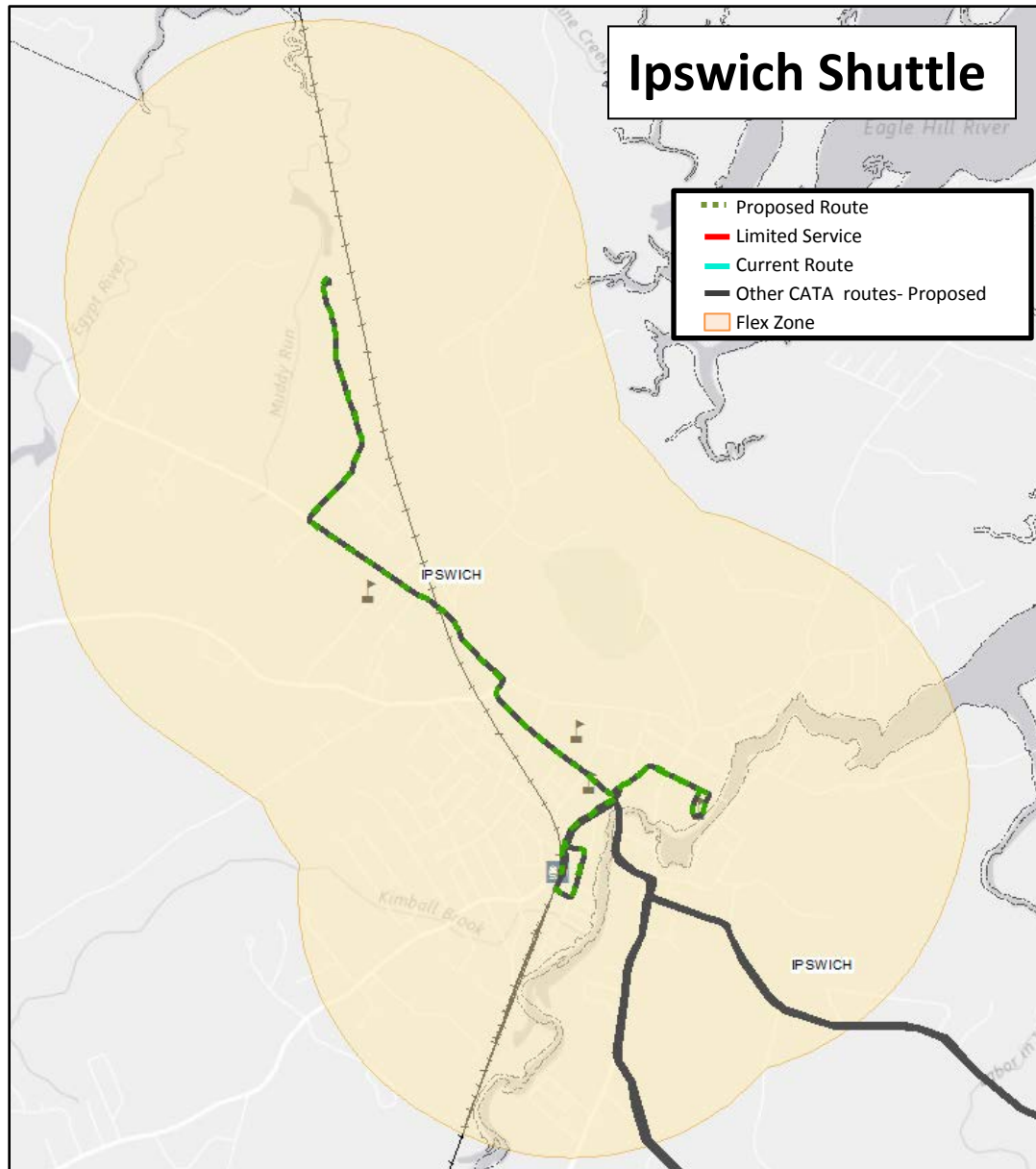
Ipswich Shuttle

This new route in Phase 2 would provide local connections to the rail station for Ipswich during the peak hours. It would operate as a flex route, offering service to anyone within $\frac{1}{4}$ mile of the main line.

Information on Flex Routing includes:

- Regular fare for customers boarding along the regular route
- Additional fare for deviations, fare set at twice local fare
- Deviation reservations would need to be made in advance via phone 1 day prior
- Set maximum number of deviations at 3 or 4 per trip to ensure schedule kept
- Can be used to cover ADA service as well

This recommendation stems out of the transit demand analysis which showed a high demand in this region. The region is fairly dense and a peak hour shuttle could provide connections to the train station.



Rockport Shuttle

No changes

Stage Fort Trolley

No changes

Ipswich-Essex Explorer

No changes

City of Beverly Shuttle

No changes

Mall Shuttle

Of the non-seasonal routes, this route has the highest productivity and ridership on Saturday. Due to the high performance of this route service should be increased on Saturday and Sunday service should be implemented

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Table 1. CATA table of recommendations

Bus Route	Alignment	Schedule	Phase 1	Phase 2	Phase 3
Blue - Gloucester to Rockport via Lanesville	Make turnaround loop in Gloucester smaller	-60 minute frequency -Service span 6 AM to 9 PM weekdays -Service span 8 AM to 8 PM Saturdays	-Change alignment -Extend service spans -Improve frequency 90 min	-Improve frequency 60 min	
Red - Gloucester to Rockport via Thatcher Road	No change	-60 minute frequency -Service span 6 AM to 9 PM weekdays -Service span 8 AM to 8 PM Saturdays	-Extend service spans -Improve frequency 90 min	-Improve frequency 60 min	
Green - Gloucester to Rockport via Eastern Avenue	Service to Industrial park on select trips. Service to Gloucester Crossing and Rockport train station added	-Service span 6 AM to 9 PM weekdays -Service span 8 AM to 8 PM Saturdays -Sunday service 10 AM to 6 PM -Weekday and Saturday frequency 30 min	-Change alignment -Extend service spans	-Improve frequency	-Implement Sunday service
Yellow - Gloucester to Magnolia	Consolidate service along Hesperus/Norman into Magnolia	-120 minute frequency -Service span 6 AM to 9 PM weekdays	-Change alignment -Extend weekday service spans -Improve frequency		-Extend service to Manchester by the Sea
Purple - Gloucester to West Gloucester	Terminate service at West Gloucester Station	-60 minute frequency weekday -Service span 6 AM to 9 PM weekdays -120 minute frequency	-Change alignment -Extend service spans -Improve frequencies		
Orange - Gloucester Crossing & Business Express Loop	Bidirectional service, split into 2 routes	-30 minute frequency weekday -Service span 6 AM to 9 PM weekdays -Service span 8 AM to 8 PM Saturdays -Sunday service 8 AM to 6 PM	-Change alignment -Extend service spans -Improve frequency	-Split into 2 routes	-Implement Sunday service
Mall Shuttle - Gloucester to Danvers and Peabody	No change	-60 minute frequency -Service span 10 AM to 6 PM Saturdays -Service span 10 AM to 6 PM Sundays	-Extend service spans	-Improve frequency	-Implement Sunday service
City of Beverly Shuttle	Cannot change service per contract with City of Beverly, but a split route with bidirectional service would better serve city's needs	No change			
Ipswich Shuttle	New Route	-Flex route with peak hour service only, 60 minute frequency		-Implement service	
Rockport Shuttle - Blue Gate Meadows Parking Lot	No change	No change			
Stage Fort Trolley	No change	No change			
Ipswich-Essex Explorer	No change	No change			
Route 133 Tripper	Essex town line to Gloucester via the High School	2 trips daily	-Implement service		
Western Ave Tripper	Magnolia to Gloucester HS via Western Ave	2 trips daily	-Implement service		
Pink Route	New route from splitting the orange into 2 routes	New route		-Implement Route	-Implement Sunday service

Appendix C

Public Outreach

PUBLIC OUTREACH

One of the primary goals of the Regional Transit Plan (RTP) is to identify alternatives and recommendations that would result in improvements to the system for existing riders and potentially attract new riders. CATA formed a Study Advisory Committee. This committee represented key stakeholder groups within the community and provided review and comment on chapters of the document as they were produced.

Study Advisory Committee

CATA formed and supported the development of a Study Advisory Committee to guide the development of this plan. Its members included local employers and business members, politicians, transit operations, transit riders and others. A complete list of committee members and the organization/group they represent can be found in Table 1.

Table 1. Study Advisory/Steering Committee Members

Name	Organization
Scott Pantages	CATOC- FT operator
Sean Recroft	Transit Rider
Walter Peckham	CATOC-Maintenance
Stephen Winslow	City of Gloucester
Dan Delouise	Business Owner, Rockport

Over the course of preparing the RTP, the Study Advisory Committee met 3 times in person to discuss the development of the plan in addition to reviewing each chapter and providing feedback. Each member of CATA's Study Advisory Committee was given access to a centralized website (midmixer) early in the project. This website hosted drafts of each chapter of the study for each member of the committee to review and provide comments. The times, dates, and locations of the meetings can be found in Table 2.

Table 2. Study Advisory/Steering Committee Meetings

Date	Time	Location
May 21, 2015	7:00 p.m.	CATA Administration Building
June 4, 2015	8:00 a.m.	CATA Administration Building
June 25, 2015	8:30 a.m.	CATA Administration Building

Public Involvement

CATA conducted two public meetings to introduce the Draft RTA Plan and recommended changes and to allow for and gather public comments. CATA notified the town clerks of each member community and published a legal advertisement in the Gloucester Times. In addition, CATA mailed over 30 invitations to

community leaders and local businesses and posted flyers on all CATA vehicles (both fixed route and demand response). Copies of a generic invitation letter and flyer have been included.

The first meeting was held at Rockport Town Hall on Tuesday, July 7, 2015 at 7:00pm. An evening meeting was scheduled to allow individuals that work during regular business hours and commuters to attend.

The second meeting was held at the Rose Baker Senior Center in Gloucester at 10:00am on Wednesday, July 8, 2015. A mid-morning meeting was scheduled to allow current bus riders the opportunity to attend a meeting. The sign-in sheets and minutes from the meetings have been included.

Summary of Feedback

CATA presented the Draft Regional Transit Plan to the audience at each public hearing. Following the presentation, the audience was asked for any comments, questions, or feedback about the plan. There was support for the route changes, the increased frequency, and increased service hours. Other questions were about Green Cities, the Town of Rockport's Park and Ride lot, and additional service expansion. There were also questions about the source of the additional funding required for implementation of the different phases.

Thank you for allowing my self and my fellow Rockport constituents the opportunity to have our voice heard. It has been a long time concern of both merchants and residence here in Rockport regarding the down town transportation and parking situation. There's a dire need here to resolve this challenge and quite frankly hinges on the long term survival of the downtown area. There is really very insufficient parking to accommodate the amount of people that it takes to keep a community of this caliber thriving and productive. Rockport, even with all it's charm, arts and culture has becoming more and more difficult to achieve a level of prosperity as merchant and gallery owners. In large part due to the logistical challenges traveling to and from the area. We have accumulated some suggestions, concerns and questions that will hopefully stimulate some real resolution to the challenges we face here and bring about a much needed change for the good of all it people and the preservation of it's renowned cultural community.

We realize some of what might be suggested here may need to be in collaboration with the Town of Rockport and believe that the town selectmen would be as enthusiastic as it community to any viable solution to help alleviate it's Transportation / Parking woes.

We hope the following may be an open door to a new and rich communications between CATA , our local community, it's businesses and the people we serve, and we thank you for all your consideration in this matter.

Currently there exist a large parking lot in Rockport that is terribly under utilized , under promoted and under maintained. I seems to be such an ideal solution that is just not recognized for it's full potential. We believe with the proper implementation this could be such an asset to the communities needs.

- We'd ask to increase the promotion of municipal park & ride lot at the transfer station...
 - i.e. Have more signs and include in advertising, in promotional materials, a signs on parking meter about the lot with map to the lot. Make available posters and/or flyers to merchants, Inns, and restaurants owners along with visitor centers... for distribution.
- Request that CATA and the Town work together for a budget to landscape the parking lot to make it more appealing to park in, as well as a share in the profits from nominal parking fee if needed.
- Designated bus-stops with visible signage (other than Dock Sq.) for example at Toad Hall, the beach and the train station. Often people drop their families off at the beach and then ride around looking for a space. Hopefully, a sign will let them know that after they drop everyone off they can then go park and ride the bus back. The sign could have a simple map of the route and a link to a website or app on which you can view the current schedule.
- Also there needs to be clear info at the parking lot itself, so people know where they are relative to the town, when the bus will come and where it goes. Again some of the more variable info like the bus schedule can be in the form of a link to a website
- Provide more incentives for people to park at the recycling center lot, possibly provide another set of rest rooms, bike rental racks and other vendor services there, instead of just an empty parking lot. Please provide more frequent shuttle service to town in the spring and fall, in addition to the summer. If not every day, then at least on weekends.

- Lastly we would hope for greater collaboration with transportation to and from Gloucester especially now with the New hotel going up... to allow visitors to experience the whole of Cape Ann.

Thank you once again for this opportunity please feel free to contact us with any questions you may have.

Best regards,

Dan DeLouise
978-282-1540
DeLouise Studio
53 Main St Rockport MA 01966

Appendix D

Public Hearing Comments



CAPE ANN TRANSPORTATION AUTHORITY
Administrator - Paul F. Talbot

P.O. Box 780, Gloucester, MA 01931-0780

(978) 283-1886

FAX (978) 281-4824

Asst. Administrator - Joseph Randazza

June 26, 2015

Dear Sir or Madam:

I would like to formally extend an invitation to you to attend one of two public meetings to review and provide comments on the Cape Ann Transportation Authority's Draft Regional Transit Plan.

CATA started the planning project just over 18 months ago by engaging a consultant, URS, to assist CATA in development of the regional transit plan. URS reviewed operational information provided by CATA, demographic information, employment patterns, and other indicators for our area. Based on their review of the current route structure and the additional indicators, and with more operational input from CATA, URS developed recommended service and route changes. A steering committee was also formed to discuss the recommendations, as well as other ideas for the future of CATA.

CATA's Draft Regional Transit Plan will be presented to the public at two meetings. The first meeting will be held July 7, 2015 at 7:00 p.m. at Rockport Town Hall, Conference Room A. The second meeting will be held July 8, 2015 at 10:00 a.m. at the Rose Baker Senior Center in Gloucester.

A flyer advertising the meetings has been included for distribution to any interested parties at your location.

I look forward to seeing you at one of our meetings.

Sincerely Yours,

A handwritten signature in blue ink, appearing to read "Paul F. Talbot", is written over a light blue circular background.

Paul F. Talbot
Administrator

Cape Ann Transportation Authority

Draft Regional Transit Plan

The Cape Ann Transportation Authority invites you to attend one of two public meetings to review and provide comments on CATA's Draft Regional Transit Plan.

Rockport Town Hall, Conference Room A
Tuesday, July 7, 2015 at 7:00 p.m.

Gloucester's Rose Baker Senior Center
Wednesday, July 8, 2015 at 10:00 a.m.

An overview of the plan will be presented, including recommended service and route changes. Copies of the Draft Regional Transit Plan will be available upon request and online at www.canntran.com starting July 7th. For those unable to attend, comments may be submitted via email to the address below or via hard copy to CATA, 3 Pond Road, Gloucester.

For additional information, please contact Felicia Webb at 978-283-1886 or at webbf@canntran.com.





CAPE ANN TRANSPORTATION AUTHORITY
Administrator - Paul F. Tolbot

P.O. Box 780, Gloucester, MA 01931-0780

(978) 263-1880

FAX (978) 261-8834

Asst. Administrator - Joseph Ramiara

Please Post

The Cape Ann Transportation Authority will be holding two public meetings to review and to provide for public comments on the Draft Regional Transit Plan.

Tuesday, July 7, 2015 at 7:00pm at Rockport Town Hall, Conference Room A, 34 Broadway, Rockport

Wednesday, July 8, 2015 at 10:00am at Rose Baker Senior Center, 6 Manual F. Lewis Street,
Gloucester

Copies of the plan will be available upon request and online at www.canntran.com on July 7, 2015. Comments may also be submitted in writing to CATA, 3 Pond Road, Gloucester, MA 01930 or via email to webinfo@canntran.com. The 15-day comment period will run from 7/7/15 to 4:00pm on 7/22/15.

CITY CLERK
GLOUCESTER, MA
15 JUN 29 AM 8:33

Draft Regional Transit Plan meeting
July 7, 2015
7pm
Rockport Town Hall

Attendance : Paul Talbot, Bob Ryan, Felicia Webb, Mitch Vieira, John Horvath, Tom Mikus, Rollyn Hoffman and Rachel Siero

Called to order by Paul Talbot at 7pm

Paul Talbot opened with introductions of the CATA personnel in attendance. He then spoke about the history of CATA. It was founded in 1974 and is currently located at 3 Pond Road, Gloucester. He mentioned the current size of the CATA fleet (30 vans and busses) and the plans to purchase more this year and next. He also mentioned the stats of our current busses as it pertains to new gps technology, cameras and the use of solar panels. He stated that in the 2013 Transportation Finance bill the Regional Transit Plan was required by all regional transit authorities.

Felicia Webb then discussed the goals and objectives of CATA for future improvements which included increasing frequency, ridership and communication with DPW and other local government offices. As well as bridging the gap between CATA and MBTA services. Felicia reviewed the plan for changes in 3 phases which are all dependent upon future funding. See attached presentation notes.

She then opened the floor to any questions or comments.

Tom Mikus asked about the background of the study. Were the recommendations for CATA's Regional Transit Plan from the consultants or did they have input from CATA? Felicia answered that the consultants gave recommendations; CATA's operations and steering committees reviewed those recommendations, added further comments and returned the info back to the consultants. The contractors took the final information into account in their final 200 page report. CATA's steering committee was made up of Paul Talbot and Felicia Webb of CATA along with Bob Ryan, Paul Scanlon, Walter Peckham and Scott Pantages of CATOC with the help of Dan Delouise (a Rockport merchant).

Rollyn Hoffman then asked if CATA expects the ridership to increase to justify any upcoming improvements. Felicia answered that we hope that it will. The thought is that if you run more services more frequently people will get on the bus. It is hard to predict.

Mitch Vieira then mentioned that a priority for Rockport is to get a clear bus route from Rockport to the Veterans Affairs office in Gloucester. Felicia said the proposed green/orange bus would allow for a one seat ride with no transfers between Rockport and the VA office. Bob Ryan mentioned the current bus route to take is the green/ Eastern Avenue bus and transfer to the orange/ business express bus at the Dunkin Donuts. Both Bob and Mitch agreed that it will be good to get a direct route once funding is available.

Mitch Vieira mentioned that Rockport residents and the Rockport Council on Aging are excited about the plan for a bus that goes from Rockport to Gloucester Crossing.

Bob Ryan wanted to clarify the tripper bus plan. During the school year there are extra busses for East Gloucester, West Gloucester, Lanesville and Magnolia to accommodate the middle and high school commuters as well as the general public.

Tom Mikus asked if CATA is currently connecting between the CATA busses and the MBTA trains. Felicia mentioned that we try to coincide with the MBTA schedule but unfortunately CATA is not necessarily told of any schedule changes.

Rollyn Hoffman asked if CATA had any plans to change the Park N Ride, such as running later at night. Paul Talbot answered that CATA has no plans at this time to make any changes to the Park n Ride.

Rachel Siero asked how often the route schedule changes. Bob Ryan answered that it hasn't changed since 2009.

Tom Mikus asked if any of CATA's recent improvements could help Rockport reach a green community status. Bob Ryan gave the example of the Park N Ride taking 11,000 people off the road in recent years.

John Horvath asked if all of the CATA busses have cameras. Paul Talbot responded that about 1/3 of the busses have cameras inside and out. It is for the safety of the drivers as well as the public. All new busses will have cameras installed.

Bob Ryan mentioned to Tom Mikus that the newer busses have bike racks installed as well.

There were no further comments or questions.

Adjournment 7:40pm

Motioned by Paul Talbot

Vote : Unanimous

CATA Draft Regional Transit Plan Public Meeting

Rockport Town Hall

Tuesday, July 7, 2015, 7:00pm

Sign-in Sheet

[illegible]

Draft Regional Transit Plan meeting
July 8, 2015
10AM
Rose Baker Senior Center

Attendance : Paul Talbot, Bob Ryan, Paul Scanlon, Felicia Webb, Walter Peckham, Lydia Bertolino, Judy Strong, Lucy Sheehan, Peter Webber, Paul Lundberg and Rachel Siero

Called to order by Paul Talbot at 10am

Paul Talbot opened with introductions of the CATA staff in attendance. He then spoke about the history of CATA. It was founded in 1974 and is currently located at 3 Pond Road, Gloucester. He mentioned the current size of the CATA fleet (30 vans and busses) and the plans to purchase more this year and next. He also mentioned the stats of our current busses as it pertains to new gps technology, cameras and the use of solar panels. He stated that in the 2013 Transportation Finance bill the Regional Transit Plan was required by all regional transit authorities.

Felicia Webb then discussed the goals and objectives of CATA for future improvements which included increasing frequency, ridership and communication with DPW and other local government offices. As well as bridging the gap between CATA and MBTA services. Felicia reviewed the plan for changes in 3 phases which are all dependent upon future funding. See attached presentation notes.

She then opened the floor to any questions or comments.

Judy Strong mentioned that the biggest complaint she has heard is that there is no direct bus route from Rockport to Gloucester Crossing. She asked if this going to take place soon. Felicia responded that the proposed green bus will go to Gloucester Crossing but it will not take place until CATA receives further funding. Rockport residents can currently travel from Rockport to Gloucester Crossing but need to make a transfer to do so and it takes a long time.

Judy Strong mentioned that the current orange bus route works great in one direction but the return ride home is sometimes 55 minutes instead of ten minutes. Felicia went on to explain that the plan is to split the orange bus route in CATA's phase 2 into two separate routes. This will make the central Gloucester trips much quicker.

Felicia mentioned that the proposed pink bus line's route (that will come from the split orange bus route) is not set in stone. CATA is open to comments on the exact route it will take.

Judy Strong asked if there was any plan to expand into Essex at this point. Bob Ryan answered no. Currently Ipswich and Essex receive dial a ride service and there is the Ipswich Trolley. Judy mentioned expanding bus rides to Essex in the evening hours for dining in the restaurants.

Peter Webber asked when all comments concerning this Regional Transit Plan are due. Felicia stated Thursday July 23rd, 2015.

Peter Webber asked what happens after this report is submitted to the state. Paul Talbot replied that CATA will wait to see if they can get additional funding to start phase 1 of their plan. CATA has to apply for additional funding through the state. Paul also provided a summary of how CATA is funded.

Paul Talbot mentioned that CATA is unsure if the new hotel in Gloucester will affect the current bus routes. Bob Ryan mentioned that there is a bus that passes just a block away from there.

Lucy Sheehan asked if it is possible for CATA to get a small vehicle that could be available to the Gloucester Council on Aging for their trips. Bob Ryan explained how other cities have requested vehicles for other COA and how it is funded. Felicia and Paul Talbot mentioned that other regional transit authorities (RTAs) have contracts with local councils. The RTA owns the vehicle and the COA leases it from them.

Peter Webber asked for clarification on the school tripper services. Bob Ryan mentioned that since 1991 Gloucester's middle and high school have used public transportation to get the students to school. The tripper busses are extra busses run before and after school to Lanesville, Magnolia, East Gloucester and West Gloucester.

Judy Strong asked about the mall bus on the weekend. She recommended there be more frequent runs on Saturday and to add bus service on Sunday. She asked what residents can do if they want to go to the malls during a weekday. Bob Ryan mentioned that as long as there is a minimum of three people requesting a ride to the mall together... they can call and get a ride on Mondays. Judy also stated that, in her experience, the earliest Saturday morning mall bus was very full. If CATA were to add another bus even earlier on Saturday, Judy believes that would be a full bus as well. People could also use the bus to get to work at the malls.

Paul Talbot mentioned that the CATA busses only have room for two wheelchairs in each bus at a time.

Judy Strong also recommended that there be signs posted on both Thatcher road and Granite Street as you enter Rockport to mention the Park n Ride. There is an electric sign posted as you enter Rockport from Main Street.

Rachel Siero asked what the next steps are to request this additional funding from the state. Felicia answered that we need to complete our report and submit it to the State this fall.

There were no further comments or questions.

Adjournment 10:35am
Moted by Paul Talbot
Vote : Unanimous

CATA Draft Regional Transit Plan Public Meeting

Rose Baker Senior Center, Gloucester

Wednesday, July 8, 2015 10:00am

Sign-in Sheet

Name

Address

Phone/Email

Lydian Bertolin

10 Orchard St

281-4279

Judy Strong

39 Main St

281-9765

Peter Walker (Chamber) 33 Commercial St.

283-1601

PAUL Lundberg (City Council) 22 Raven Lane

290-8281

PAUL SCANLON

3 Pond Rd

281-8315 x12

Walter Reckman

5 RD Drive

508-574-8981

Lucy Sheehan

COA

978-281-9765



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